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RODMAKING FOR BEGINNERS

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A BEGINNER.

THE ANGLER'S WORKSHOP

VOLUME I

Rodmaking for Beginners

BY PERRY D. FRAZER

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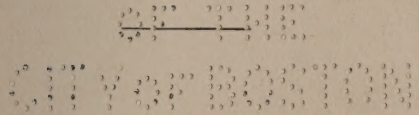
Illustrated



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Introduction

THERE are so many anglers who take pleasure in making and repairing their own rods and fishing tackle that I have set down some simple hints that may be of use to anglers who are not as yet skilled in work of this character. Like most of them, I have worked with few and simple tools. The methods I shall describe may seem amateurish and crude to the skilled professional rodmaker, but the novice who is guided by them will pass many a pleasant hour, and will turn out rods of which he should be proud.

The work described is that which the novice can perform with the plainest tools, principally file, sandpaper, jackknife and plane.

PERRY D. FRAZER.

New York City,
January, 1908.

Rodmaking for Beginners

CHAPTER I

A Review of Fishing Rod History

When we speak of fishing rods to-day, reference is invariably made to those rods that consist of two or three parts fitted with splices or ferrules for greater convenience in carrying to and from the fishing grounds.

Without question the best rod is one made of a single piece, or of strips rent and glued, but with no joint or ferrule to interfere with its resilience and action.

That it is next to impossible to carry a full length rod on trains and in other conveyances is obvious; hence the skill of amateur and professional rodmakers is constantly directed toward the task of making the two and three joint rods as nearly perfect in every way as is possible under the circumstances. That they succeed

very well indeed is evident in the beautiful rods now used in fishing and in tournament casting.

For several centuries all of the best fishing rods were made in Great Britain. There solid wood rods were the favorites; in fact—with the exception of rods made with spliced cane and whalebone tips—the only rods used until a comparatively short time ago, when the rent and glued cane rods invented and made by Americans were adopted abroad. Even to-day solid wood rods are very extensively used in Great Britain. Their manufacturers have never been very successful in competing with the best American hexagonal split bamboo rods, and some of their fly-rods are made up from split-and-glued material purchased in the United States and sold as English rods. High grade American split bamboo rods, too, are well known and liked over there.

Hickory has been largely used in England for parts of medium and heavy fly-rods, the material being shipped from the United States and Canada in billet form. Other materials are: Ash, lancewood, whalebone and cane combined; ash and lancewood in combination; willow, blue mahoe,

washaba (our bethabara), whole cane, greenheart, and greenheart and whole cane combined. For a number of years greenheart alone, or greenheart in combination with whole cane, was a standard rod material there, but this is of comparatively recent adoption, as angling writers of fifty years ago seldom refer to greenheart. Alfred Ronalds, writing in 1836, said:

"The best materials are, ash for the stock, lancewood for the middle, and bamboo for the top."

Mr. Ronalds had in mind the whole bamboo which, according to later writers, was first imported into England by army officers returning from India. They, however, looked on it with favor because it was ideal for lances, and perhaps their preference for the thick-walled canes, now called "male" bamboos, led to the belief that was prevalent for many years, that this was better for rod making purposes than the thin-walled "female" canes. Exhaustive tests with scientific instruments have proved the thin-walled bamboo better for the purpose.

Theophilus South, in his "Fly-Fisher's Text Book" (London, 1845), prefers ash to willow

for butts, hickory for middle joints, and favors tips made from lancewood, cane and whalebone, spliced together—four and even five pieces in a tip.

The African greenheart, obtainable in the yards of the importers in Stanley road, Liverpool, is probably much better material for fishing rods than the greenheart sold in the United States, which comes from various places in the tropics. That which comes through Liverpool is picked over by the British buyers, and our importers must take what is left. This probably accounts for the growing scarcity of first class greenheart. Not a few of our rodmakers decline to guarantee this material, which is most excellent for the purpose when it is good.

Early fishing rod materials in the United States were: ash and lancewood in combination; hickory, mahoe, greenheart, washaba (bethabara), snakewood, beefwood, cedar, osage orange, shadblow, ironwood, dagama, peppercane, Calcutta bamboo, our Southern canes, jucara prieto and many others.

Years ago it became a common practice to saw or rive strips of wood, plane these square,

glue four pieces together and plane round to form rod joints. The belief was that joints so made were much stronger and less likely to break than would be the case with a joint made from a single piece of wood. This method was followed by splitting strips of bamboo, planing two sides of each strip and gluing four of them together to form a joint, then planing the latter

FIG. 1.

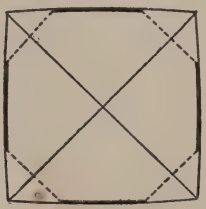

FIG. 2.

round. This was made possible by placing the enamel side of the bamboo within the strip, as shown by the shaded lines in Fig. 1.

The enamel surface being slightly convex, it was difficult to work and glue these strips to form nice joints, and this method, which seems to be ideal in other respects, gave way to one

in which the enamel was placed on the outside, and the section made almost octagonal in form by means of planing off the corners, as shown by the dotted lines in Fig. 2. This method is still followed to a certain extent by amateurs in making tips, and for the beginner at split bamboo rod making, it has many points of excellence. The principal ones are that it is easier to make a joint of four than six pieces, and if these are carefully fitted, glued and varnished a fairly good rod is the result.

It is possible the manufacture of these four-strip rods of solid wood or cane, and the difficulty in keeping water out of them with the inferior glue and varnish then available, resulted in the method often followed of winding joints solidly with silk thread or narrow silk tape. This made the rod soft or logy and was discarded finally, to be revived in recent years, and again discarded.

The four-section cane rods gave way to six-strip rods, and these have come to stay. They have been used successfully for the past generation and have outlived their offshoots, the eight-strip, the seven-strip and the steel-centered single

and double-built rods, showing that they are based on very sound principles.

It is the belief among rodmakers that in a hexagonal rod the upper and the lower strips are called upon to perform the greater part of the work of casting and playing a fish, but the strain on the upper strip is supported, not by the lower strip alone, but by the three lower strips, as shown in Fig. 3.

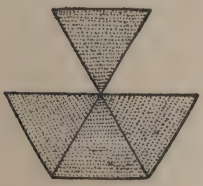

FIG. 3.

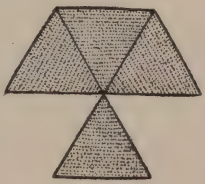

FIG. 4.

When the greatest strain falls on the lower strip, the three upper strips support it, as pictured in Fig. 4. This seems to be borne out by the fact that in tournament casting—the hardest work a fly-rod is called upon to perform—it frequently occurs that the lower strip is fractured, but the strength of the rod is but

little impaired, and turning the rod so that the break comes on the side leaves it in good shape for further use, if the point where the strip is fractured be wound with silk and varnished.

Our English friends, not satisfied with plain hexagonal split cane rods, have resorted to double built rods, to steel cores, and to winding in double spiral form with ribbons of steel, but

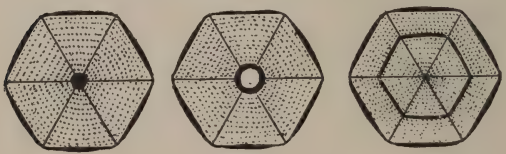

FIG. 5.

Hexagonal cane rod, steel wire center and steel tube center.

Hexagonal cane, double built.

while these methods are moderately successful with them, the result is to overload the rod, making it top heavy or logy. Sectional views of these are shown in Figs. 5 to 9 inclusive.

Frederic M. Halford, in his book, "Dry-fly Fishing" (London, 1902), says of American fly-rods that, judging from those he has seen, they "are too whippy for our insular ideas and seem

generally to lack backbone. They are also rather light in the point, the effect of which is to render it difficult if not impossible to recover a long line with them. The fashion of the present day is to use a rod that is slightly topheavy, and although this is more trying on the wrist, yet, considering all points, is a fault the right way."

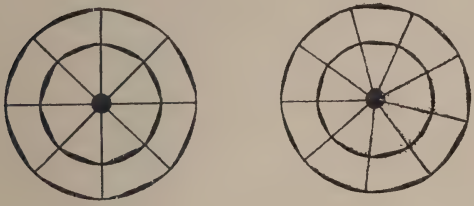

FIG. 6.

Octagonal cane rod. Nonagonal cane rod.
Both steel center and double-built.

His preference then was for a rod 9½ to 11 feet long, so it must be assumed that he referred to American rods of light weight. This seems to be true, for he quotes Francis Francis who, in his "Book on Angling," told of making a cast of twenty-six yards with a 10½ foot rod. No American five-ounce rod of the present time

would be accepted as a gift if it failed to lay out seventy-eight feet, and the average six-ounce rod, in the hands of an angler of ordinary skill, will send the fly yards further, if the need arises.

Mr. Halford says there are only three materials worth considering: split cane, greenheart and whole cane, in the order given. Aside from its fault of occasionally snapping off short, he likes greenheart, but gives double enamel split cane the preference.

FIG. 7.
Steel-ribbed split-bamboo rod.

I quote Mr. Halford at some length, for of all modern English angling literature his books on "Dry-fly Fishing," "Dry-fly Entomology" and others, and his numerous papers on angling are, to me at least, the most impressive. Among other things his clearness of expression and his habit of giving more than full credit to his friends for angling hints show his sincerity and fairness.

But Mr. Halford had no patience with steel-centered rods; in fact, he says that the controversy in the English press anent the inventor of the method was a waste of ink and paper, as steel-centered rods were of no practical use. "Consider," says he, "the effect of rigidly fastening the two materials together. The one with

FIG. 8.

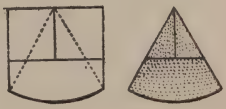

FIG. 9.

Eighteen-strip rod, and method of forming each of the three-piece strips.

the quicker action must of necessity tend to hurry the slower material, and the one with the slower action must equally of necessity tend to retard the action of the quicker material. What must be the effect? A tendency to disintegrate their union. For me," he continues, "they have not cast better; they have not cast more easily; they

have not cast more accurately, than the ordinary split cane by the same maker. They are certainly more tiring to the wrist, and when killing a fish I do not think that they give any real accession of power."

In 1889 Hardy Brothers employed an engineer who tested specimens used in rodmaking. All were 24 inches long, .32 of an inch in diameter for round rods and .16 of an inch on each side of the triangular sections of glued-up hexagonal rods. The tests were for resilience, deflection, number of vibrations before coming to rest with various weights, specific gravity and breaking strain. The best results obtained, in the order given, follow: double enamel glued cane, steel centered; double enamel glued cane; hexagonal glued cane, steel center; hexagonal glued cane; greenheart, built up; hickory built up; round greenheart; lancewood.

In theory at least it would seem that in a rod wound with narrow steel wires, these would constantly shift with the spring of the rod, relaxing in hot weather and contracting on cold days, the general effect being to shear windings and varnish, and to rust. Certain it is that one

of the British firms which adopted steel ribbing some years ago, now advocates a braided silk sheath to cover the steel.

A Frenchman has made rods in which flat steel strips have been let into the wood, and my impression is that a British manufacturer has adopted the invention.

Some years ago a Scotchman invented a similar method, but he used fine piano wires instead, one being let into each of the six strips and wound with silk. Unfortunately he died before succeeding in his efforts to interest a manufacturer in his work.

In America not much attention has been paid to steel centers or steel whipping for rods. One firm makes a steel center rod, and another one winds both wood and split bamboo rods with copper or bronze ribbons in much the same manner employed abroad in winding with double spirals of steel. I have one of these metal-whipped rods, and must say that it has merit, for with it a fly can be cast very prettily in trout fishing, and it is no doubt strong, but to one accustomed to an ordinary split bamboo it has an action which, while pleasant, is peculiarly

its own. Without wishing to disparage these methods of strengthening rods, for my own use I prefer plain whipping with narrow bands of fine silk at intervals of three-fourths to one and one-half inches, and believe these are sufficient for any rod of the class generally made in the United States.

As previously stated, attempts to strengthen rods by winding them solidly with silk have been made here during the last half century, but while it is claimed for these rods that they seldom break and will withstand severe strain, I would not advise the amateur to attempt solid winding. Rods wound solidly with silk on a machine are bound in all places with equal pressure, and if this winding gives strength, as claimed, the strengthening medium is uniform. In winding by hand you will at first lay the silk on with the greatest tension you can exert, but it is tedious work, and after a few minutes your fingers will begin to cramp and ache and you will wind less carefully. When you stop to rest the tension is relaxed, then you resume with vigor, and so on until the long contract is finished. The result must be that the silk is wound so tight

in places that it will cut into the wood when the preserving medium causes it to shrink; elsewhere there will be loose spots, followed by tight places—anything but uniform winding, giving you a soft rod.

In this way you may defeat your purpose, yet never know where the real fault lies. Ten to one the wood will be given the blame, as being poor, and you may try the same thing with another rod, to be again disappointed.

It can be said with perfect safety that six-strip split bamboo is to-day the favorite fishing rod material in the United States. More rods of this sort are used in fly- and bait-casting for fish and in tournaments than all other materials combined. They are even replacing solid wood to a certain extent in salt water fishing. Many great factories have been working steadily to their full capacity for several years, turning out split bamboo rods for the markets of the world, and the best of them have been for a long time and are now far behind with their orders. It is a good trade, that of a first class fishing rod maker; one in which steady employment is certain.

While our British friends are still experiment-

ing with rod materials, using cane and wood and steel in combination, our makers are plodding along with their work, turning out the best hand made split bamboo rods the world has ever known, and satisfying their patrons. In years they have not added to their rods any features of startling importance, but they have instead constantly endeavored to produce perfect rods, until to-day the best hand made rods are indeed works of art, yet powerful and durable withal.

Only one change from the regulation six and eight-strip rods is prominent. This is a method patented several years ago by the late Fred D. Divine, consisting in twisting the six strips slightly while the glue is still fresh, so that the joints are spiral, the theory being that a rod so treated is stiffened and that the work does not fall on the upper and lower strips alone, but on each one of the six. The method is highly spoken of by anglers, and I myself have used such a rod with pleasure and satisfaction. At one time I tested two fly-rods that were exactly alike in length, caliber and weight, one spiral, the other plain six-strip. They were held on a table side by side while a half-ounce weight was suspended

from each tip. The spiral rod sagged very little, whereas the other drooped four inches lower.

The steel rod, that has become so popular in the Middle West and South for hard use, is now often employed for bait-casting.

On salt water bethabara, ash and lancewood, dagama, lancewood and greenheart are the favorite materials, although, as stated above, split bamboo is coming into more general use.

In fly-casting there has been very little change in types of rods during the past decade, but in bait-casting a complete change has taken place, and to-day the bait-caster's methods are more nearly like those of the fly-caster's than ever before, in that both use artificial lures in preference to live bait wherever success is at all possible. Both are working toward finer tackle and are following more sportsmanlike methods in fishing as a pastime.

Until quite recently angling for game fish in fresh waters consisted in casting the fly; in casting with medium weight rods and minnows or other live bait, sometimes attached to a spoon or spinner; in still-fishing with minnows, worms, grubs or other insects; in trolling with live or

artificial lures. There were other forms, but these will suffice for the present. Nearly all rods were long and heavy. In order to make one of these, skill of no mean order was required, and amateurs who made attempts were more often disappointed than satisfied.

Then came the change in the methods of using the bait-casting rod. Extremists went from rods of eight and nine feet to those of six, five, four, even less than four feet in length, but as time passed and experience has been gained, many of them have settled on five or six feet as a very satisfactory length for the superb little rods with which they cast a long line and some form of artificial lure, using a free-running multiplying reel.

It is possible to make these new rods as light and almost as graceful as the trout fly-rods. Angle worms and live minnows and doodlebugs are no longer considered necessary by way of lure, and the methods of the bait-caster may be made as cleanly and as skillful as those of his brother of the fly-rod.

CHAPTER II

Fishing Rod Materials

THERE are many anglers who are fond of doing things themselves, and to such of them as fancy bait-casting, the idea of making their own rods appeals strongly. And while it is beyond most of them to make a passable rod nine feet in length, such as was used years ago, there are very few persons possessed of ordinary skill who cannot make a short rod of the type that is popular to-day.

To give assistance to those who would like to try this fascinating pastime is the purpose of this book. I disclaim any scientific knowledge in the art. Rather, I have simply plugged along at the work, making mistakes and correcting them, doing things topside down, perhaps, as a pro-

fessional rodmaker might say, but attaining the end sought, after a fashion, in time.

During the past decade I have made almost every type of rod, and have worked split bamboo, dagama, lancewood, hickory, ash, greenheart, washaba (bethabara), jucara prieto and other materials, but in no part of my rodmaking have I had any better facilities for working rapidly and easily than the average busy man commands, hence I feel confident in telling the novice how he can do this and that part of the work, for I am giving the results of my own experience, backed by the sage advice of some of the best known professional and amateur rodmakers and anglers, to many of whom I am greatly indebted for friendly criticism in my efforts to assist beginners.

One thing which this slow and methodical hand work has taught me is this: To take advantage of everything which will simplify the work of rodmaking and finishing. I would have you bear this in mind in reading the chapters that are to come. Some of my methods may seem clumsy to those of you who have access to machine tools, or who have been advised by

professional rodmakers; but the average beginner at rodmaking will work with even poorer facilities, perhaps, than I have commanded, and for him the methods described may be of some value. Above all things I wish to make all steps plain and simple. They are not scientific, but are practical.

It is folly for the beginner to attempt to make his first rod of split bamboo, or even to obtain glued-up stock and fit it. Instead, he should obtain that material which is easiest to manipulate, and carry the work through to some sort of conclusion. Then, and only then, will he master the first step in rodmaking and begin to realize how easy and yet how difficult it is to make a good rod.

Without question split bamboo is the best material known to-day. If you can obtain the material in butts, joints and tips, glued-up, so that the "making" consists merely in finishing it and fitting handgrasp, ferrules and trimmings, if care is exercised a very good rod will be the result. But I would strongly advise the novice not to attempt to make a split bamboo rod complete; at least not until he has had ample practice in mak-

ing all-wood rods. Instead, pay a visit to some professional rodmaker, if this be possible, at a time when he is making split bamboo rods, and ask permission to watch him at work for a little while. If you do, my word for it, you will go away a wiser if not a sadder man, for you will be convinced that you lack the skill necessary to finish the six slender strips and fit them together perfectly, even if you can secure bamboo that will prove to be worth cutting up.

This is one of the difficulties encountered in rodmaking, for not all of the material that looks good will be worth the labor of cutting. I know one old rodmaker who, on splitting out his material, tests each slender strip by bending until the ends meet, then examining the circlet for weak spots, and if any appear he smashes the whole piece and tries again—a severe test, but one that will show defects before further labor is wasted. Not that this is the correct test, but it is one of several, the most important one being an examination based on long experience.

Some of the best rodmakers will supply you with glued-up butts and joints, and if you are determined to make your first rod of this material,

select these somewhat longer than the joints of your rod-to-be, so that you can pick out the best part of each piece when you come to fitting the ferrules. Take only hand made stock, for machine made material is not always worth using. The hand made stock will cost more than you anticipate, but it is much cheaper in the end. If glued-up split bamboo is to be the material, the method of performing the different parts of the fitting will be the same as described further on for all-wood rods.

Next to split bamboo in the woods easily obtainable in the open market comes washaba, or, as it is known in the trade, bethabara. This is a heavy wood, but it is nicely adapted to short bait-casting rods, and one can be made to weigh five to six and one-half ounces, and very slender, that will be exceedingly powerful and full of ginger. Hence the weight of bethabara does not signify. Bethabara slightly resembles butternut or a light grade of black walnut in color; with this exception, that when freshly sawed the surface is covered with greenish yellow dust, very heavy and a bit sticky to the touch, giving one the impression that the wood has been sprinkled

with yellow ochre. The wood being so hard, the rough saw marks hide the grain, and it is difficult to tell a good piece from a bad one. Look closely at all sides, or better, scrape two sides until the grain will show, and if there are any knots or if the corners show splinters that may be broken off short, discard it and look further. Pound the sticks smartly on the floor and examine closely for worm holes, which, although very small, are fatal to good material.

I have said that the wood shows dust of a greenish-yellow color, but this seems partially absent in some bethabara. I prefer the grade which shows this characteristic, and which the English rodmakers call green washaba; but the brown washaba, the grade that does not, is much harder and has a closer and longer grain in the perfect pieces, although it seems more difficult to get perfect pieces in this grade. Hence it is well to stick to the green or dusty grades, which run nice as a rule and can be planed from both ends and on all sides with impunity. Some dealers sell other varieties of imported woods for bethabara, and some try to supply very poor greenheart instead; but reliable men may be de-

pended on to give you what you ask for. The fine shavings from bethabara are so wiry and tough that a handful of them can be used for a long time in polishing finished joints. They cling together totally unlike those from greenheart, which are short and very brittle.

Bethabara logs are sawed into planks which go to the rodmakers in thicknesses of seven-eighths of an inch, sometimes more. Generally the lumbermen cut logs into pieces seven-eighths by one inch and three feet long, but you can get other lengths. These pieces must be ripped. If, however, they will cut the material to your order, it will be well to have the butt five-eighths of an inch and the tips three-eighths for a two-piece rod. There is a good deal of cutting before you can be satisfied with the squared stock; and another thing, you must decide which end of your stock is to be the butt, or large end, before you begin to taper it.

There are two or three peculiarities about this wood that will astonish you at first. Stock that is cut thin may be very crooked. I have worked pieces so crooked that it seemed a waste of time to do anything with them, but after they were

finished and the rod hung up by the top on a brad driven into the wall, all the kinks soon disappeared and the rod became as straight as a perfect arrow.

This method of straightening is advisable with any rod, and especially tips. Where rods are put away in tackle cabinets or closets, with all parts tied up in a cloth partition case, it very often happens that one of the strings of the case is tied more securely than the others, thus bending the tips slightly; and, if left in this shape for long, with perhaps some heavy object resting against all, a very crooked rod may be taken out later on. Even standing joints on the floor with the tops resting against the wall may warp them. Better hang tips up, and the whole rod, too, if practicable. Dealers who handle the finest wood rods often suspend them all from the tops in cases made for this purpose.

Bethabara as a rule does not warp or take set easily, but cut any wood into thin strips and throw it about and it will warp out of shape. Varnish puts an end to this, as it prevents rapid changes of temperature from affecting the wood easily.

BROOK TROUT FISHING WITH A LIGHT FLY ROD.

In preparing to work bethabara, put on a pair of overalls or a long apron. The dust is very penetrating and somewhat sticky, and there is an oily substance that adheres to the edge of the plane, dulling it until removed. Wash your hands with soap and water, and you will be surprised to see the water turn a deep salmon color, and the lather from the soap just like so much red paint. No stain need be feared, however, although old rodmakers tell me that after continued working of this wood, their hair takes on a slight pinkish shade, due, evidently, to the action of the alkali in the soap.

Dagama in perfect pieces is even more easily obtainable that bethabara, and of all the rod materials known I strongly advise the beginner to make his first rod of dagama. He will have less difficulty in working it, is more likely to get first-class stock of nice straight grain, and it will give him good satisfaction. Having in mind the disappointing experiences I had in my first attempts to work bethabara, due for the most part to poor material, I asked several of the best known firms of rodmakers for their opinions, and these agreed perfectly with my own, which is

that while first-class bethabara will give better satisfaction, dagama of good quality is more easily obtained, can be worked to better advantage by the novice, and will make a good rod.

Dagama comes from Cuba and is rather common. The tree grows to a height of forty or fifty feet and has few branches. As a rule it comes in billets six or seven feet long, split from the log, but as these are not expensive, the novice who expects to make two or three rods can use the best part of a billet to advantage. The wood is rather white when first split, but exposure to the air turns it pale yellow and it darkens slightly when made up into rods. It resembles lancewood so closely that unless pieces of both are placed side by side it is difficult to tell which is which. Its grain is closer and straighter than that of lancewood, however, and it has none of the pins or knots that characterize lancewood and make that wood so unsatisfactory to work. Dagama is light, stiff and elastic, breaks with a long, splintering fracture, somewhat like hickory, is easy to work with or across the grain, and may be highly polished. Ferrules

slightly larger than those used on bethabara will answer.

I have heard it said that dagama is at its best in a moist climate, and is therefore peculiarly adapted to use on salt water; that it becomes somewhat "brash" in dry climates, like hickory. I regret that my personal experience with the wood is confined to regions near the sea level, and that I cannot affirm or deny this statement. Hickory, I know, although exceedingly tough and resilient as a rule, failed completely when used for the long whip stocks of the old-time stage coach and army ambulance drivers in the dry regions of the Southwest. Although soaked with oil, they were totally unreliable after drying out, and would snap short off like reeds. Bait-casting rods are not used in such dry regions as a rule, but on the Southern Pacific coast, it seems, bethabara gives better satisfaction than either greenheart or dagama. The best fishing is in the dry season there.

The late Henry P. Wells was one of the first angling writers to mention dagama, and he praised it very highly, both in the first edition of his "Fly-Rods and Fly Tackle," which was

published in 1885, and in the second edition, which appeared in 1901. Of dagama he said:

"Compared with a stick of approved greenheart of equal size the dagama showed no inferiority that I could detect, while it was certainly much lighter. * * * I have made and used several rods made of dagama, and have seen many made by others. If well selected and well seasoned, as a rod wood it is difficult to equal, much less excel, as far as my experience goes. It is very strong, very elastic, considerably lighter than any wood I know of which has equal strength, and works with a keen tool in a way that is simply a delight."

The late John Harrington Keene favored four varieties of wood for rods, after split bamboo. These were snakewood, lancewood, greenheart and bethabara. Snakewood, in his opinion, was the best where weight was not important, as for bait-casting rods. "It is," said he, "one of the most satisfactory woods to work that I know, cutting smoothly and without apparent grain, and coming out from the plane with a surface like ivory for smoothness. Greenheart is a much harsher wood to work, but if the tool is keen it

works fairly well. For fly-rods it is one of the best woods I know, being of medium weight and great stiffness."

Of dagama Mr. Keene said: "While it is tough, it lacks the rigidity of lancewood and is inferior to it for rodmaking. Lancewood, which if well selected, is a most desirable wood for rods, is one of the easiest woods to work, has little visible grain and cuts smoothly."

It seems, however, that Mr. Keene's opinion of split bamboo changed after he came to the United States to live, for when he wrote "Fishing Tackle, its Materials and Manufacture," (London, 1886), he said: "The jungle canes are of Asian growth, and are chiefly utilized for the glued-up cane rods which are so popular —rather undeservedly, I think."

At that time Mr. Keene pronounced greenheart "the very best all round material for all the joints except the butt of fishing rods of whatsoever description."

Curiously enough, he says "the beautifully mottled appearance of a well finished cane rod is produced by staining the wood with aqua fortis and nut galls. The stain is burned in imme-

diately it is put on." Evidently, if this was true, the rodmakers of that time used other canes and attempted in this way to imitate the Calcutta canes.

Lancewood is used more than any other material for all-wood rods in America, although it does not seem to be very much used abroad at present. In England greenheart is more of a favorite, but over there more attention is given to combinations than here. For example, hickory is frequently used for butt joints in high grade rods, whereas on this side of the water it is put into no rods save the cheapest ones, or imitations of bethabara or some other wood, stained. Over there, too, whole cane butts and even middle joints, with greenheart tips, are common, while as a rule we stick to one material throughout the rod.

Lancewood is more easily obtainable than bethabara. The latter comes from Africa by way of Liverpool, whereas lancewood in large quantities is brought up to New York by the coastwise vessels trading in Southern waters. It costs less than bethabara, and is much easier to work. It is not so heavy as bethabara. In the

rough it is easier to select good stock than is the case with bethabara. But it is "softer" and more resilient in equal diameters, and has not the steely snap and quick recovery that characterize the other variety mentioned. In addition to this it is prone to take set; in other words, to warp permanently, and this fault is more marked on damp than on dry days.

There are so many varieties of wood available, and all more or less excellent for rods, that the beginner may be tempted to try others than those recommended. But my advice is that he confine his first experiments to either dagama or bethabara. Then, after he has acquired some knowledge of squaring, rounding and finishing solid wood, and fitting hand grasps, ferrules and tops, he may feel safe in making a split bamboo rod, since this will be the goal of his ambition.

Good Calcutta bamboo is very difficult to obtain. Japanese bamboo is inferior to it, and I would not advise its use. Nearly all of the Calcutta bamboos are marked with alternate bands or patches of natural and scorched enamel. Two varieties are commonly known. The so-called "male" bamboo has thicker walls than the

"female" and is generally chosen for this reason. Careful experts tell us, however, that in this thick-walled bamboo the strength diminishes more rapidly from enamel surface to hollow center than in the thin-walled bamboo. The enamel or rind is tough and hard. Under this the cells increase rapidly in size and their walls diminish in strength, the inner part being more pith-like than in the thin-walled bamboo, whose cells are smaller and their walls stronger.

Various reasons are given to account for the burning of the bamboos by the natives of India. The late Henry P. Wells, who studied the question carefully, gives six reasons, as follows: A religious ceremony; roasted over a gridiron to kill borers; also to burn off adhering leaves and vines; for ornamental purposes; accidentally burned in firing jungles to destroy creeping vines; seared with hot irons in straightening. He leaves it to his readers' fancy to decide.

J. J. Hardy, himself a rodmaker, in his "Salmon Fishing," says the natives lay the more crooked canes in fires made of grass and leaves, to soften before attempting to straighten them. "While this firing doubtless solidifies the sap and

hardens the cells greatly," he writes, "it destroys fully 50 per cent. of the bamboos for rodmaking by burning through parts of the outer skin, the effects of which may be seen in the very dark blotches. Where this appears the material is worthless, all the original structure having been destroyed. It has been very difficult to persuade the natives to adopt special methods of heating for the purpose of straightening, in order to avoid this overburning; but it is satisfactory to know that better methods, under strict supervision, are now being employed." Mr. Hardy says it is not unusual to split up thirty to fifty culms and test the strips before sufficient good material for an 18 foot salmon fly-rod is obtained.

The bamboos obtainable are generally 1¼ to 1½ inches in diameter at the large end and only four or five feet of each one can be used to advantage.

Tonkin canes come from the province of that name in French Indo-China, on the Gulf of Tonkin, an arm of the China Sea. Probably most of them are cut in the valleys of the Black and Red rivers, which lie due east of Mandalay in Burma, and as Calcutta and Tonkin canes grow

in the same latitude, this may account for the belief held by some that Tonkin canes equal Calcutta bamboo for rodmaking purposes. It is, however, a fact that very few professional rodmakers will admit that anything can equal first class Calcutta canes. A veteran says one reason why he is inclined to use Tonkin is found in the fact that good Calcutta canes are very difficult to obtain, and with them there is so much waste.

Many of the Tonkin canes furnish thicker material than the other variety, and if properly seasoned and selected, make excellent fly- and bait-casting rods. Few of them are burned, which furnishes another reason for their popularity. Some are stained unevenly before they are split, and when the strips are matched and glued these mottled places appear here and there on the rod, giving the effect that is so pleasing to anglers of the old school who, through custom, prefer the mottling to the white enamel of unburned canes. The staining is a harmless process, and may be produced in several ways.

Tonkin differs materially from Calcutta. The knots are smaller and less troublesome, and in the rough beveling you can plane through the

knots with safety. This cane is much harder than Calcutta, more brittle, and in breaking a strip the surface gives way in long splinters, leaving softer pith strata which are tough but not springy. Because of its greater stiffness it is used for tournament rods. It resembles somewhat our Southern canes, but its surface is darker and the fibres reddish. It is harsh and glassy, soon dulls the edge of the plane, and must be handled carefully or the hands will be cut and scratched.

Tonkin canes cost more than Calcutta. Rod-makers who use them will not say much about them. I do not pretend to know which is the better material. I will, however, state that I made two fly-rods at the same time, one from the best Calcutta I could obtain; the other from Tonkin. The Calcutta rod required twice as much time and showed many imperfections. The Tonkin rod was satisfactory. Both were exactly alike. The best French glue was used on both.

It does not follow that, because some rods are made with double enamel, that it is the better method. If first class bamboo is used, and the strips are well made and perfectly fitted, noth-

ing can surpass the plain hexagonal rod; but the difficulty of obtaining good bamboo is great and is increasing, and it is not always possible to get material thick enough to make perfect triangular sections without resorting to the double enamel process in butts and joints. Many

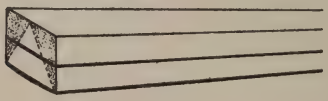

FIG. 10.

rods are now made the centers of which are hollow because of this difficulty of getting material thick enough to make all strips perfectly triangular in section.

In an attempt to choose between double enameled hexagonal bamboo and octagonal bamboo, the former may safely be given preference. In an octagonal rod the butt and middle joint are stronger, provided the caliber is large, but eight-strip tips consist of so much glue and so little cane that they will not withstand so much hard usage as will the six-strip cane and

frequently give way at the ferrules, particularly if the parts are carelessly twisted.

On the other hand, the gluing of double enamel hexagonal strips is partially protected from moisture, and if properly made a double enamel rod is strong and powerful. Besides, this method

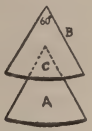

FIG. 11.

is a simple one, and double enamel strips are easily made in several ways, the common forms being to plane two strips of rectangular section, glue them together and then file as in a single strip; the other to make a strip of triangular section, then plane off the apex of the triangle, glue another strip to the base and file this down.

In Fig. 10 the dotted lines show the form of the completed section, and the shaded lines the enamel. In Fig. 11, *a* is the outer strip with apex of triangle planed off; *b*, second strip glued to *a*; dotted lines *c* indicate section of finished strip.

The specific gravities and weight of various woods mentioned are given by Mr. Wells as follows, the standard being distilled well water:

	Specific Gravity.	Weight. 1 cubic foot.
Snakewood	1.3718	85.74
Bethabara	1.2140	75.88
Greenheart (dark)	1.0908	68.18
Jucara prieto	1.08	67.30
Lancewood	1.0335	64.59
Six strip split bamboo	.9915	61.96
Four strip split bamboo, enamel inside	.9678	60.49
Greenheart (light)	.9643	60.26
Dagama	.90	56.10
Hickory	.7963	49.77

CHAPTER III

Mounting and Finishing Materials

WHAT shall the handgrasp be—solid cork or a form wound with cord? Simplicity, effectiveness and economy point to cork. This statement may surprise you, but it is true. Cork, seemingly difficult to work, only requires proper treatment, and with it the weight of the rod can be kept down.

The cork companies in New York, Pittsburg and Chicago will furnish handgrasps to order ready to slip over a solid center. These are made either of solid cork discs or of suberit, a composition of ground cork and cement. They will also furnish corks similar to those used in vaseline bottles and one-half inch thick, at about seven cents per dozen for the best quality. I

generally purchase four dozen at a time, costing twenty-five cents, and select the best ones for use. The 1¼ and 1⅜ inch sizes are best for rod grasps.

Wood forms for handgrasps can be purchased from rodmakers in various lengths and sizes, with either single or double grasp, and with a hole of any size desired bored clear through. They cost twenty to forty cents. If you can have access to a lathe, however, it will be a pleasure to turn your own handgrasps from sumac, which you can obtain in almost any thicket during a walk in the country, or white pine. Bore the hole first, fit a plug in this, center the ends, and shape the outside to suit, bearing in mind that the cord to be wound on will increase the diameter about 1-16 inch.

Cord for this purpose is obtainable from fishing tackle dealers. Light green braided cotton cord looks nice when varnished, and makes a good firm grasp, but it is inferior to cork.

All ferrules, reelseats, tapers and buttcaps should be German silver. These cost a trifle more than brass nickeled, but they are harder, stronger and more durable. Besides, nickle

glitters while German silver tarnishes just enough to become slightly dull, but is not injuriously affected by chemicals in the water.

There are only three types of ferrules that merit the consideration of the beginner. These are:

1. For split bamboo rods, welted and capped

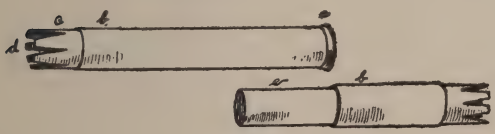

FIG. 12.
Serrated Ferrules.

(or shouldered) ferrules, with the caps serrated, so that the silk may be wound over the springy saw-tooth like ends illustrated in Fig. 12. The reference letter *a* shows the welted end of the ferrule, which protects and strengthens it. *B* is the cap or shoulder, which is turned down slightly at *c* to permit winding with silk, which should extend ⅛ inch beyond the flexible serrated ends *d* and bind the ferrule rigidly on the wood. *E* is the center. The caliber of a set

of ferrules is taken at the point indicated by this letter. The outside diameter of the center at *e* is exactly the same as the inside diameter of the ferrule.

2. Capped and welted ferrules with the caps split and also turned down slightly for winding, as illustrated in Fig. 13. The reference letter *f* shows the capped ends turned down so that the

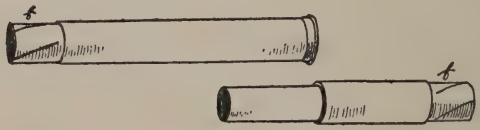

FIG. 13.
Split Ferrules.

cap and the silk winding will be of the same diameter. This end is split in several places with a very fine saw, so that the silk will bind the ferrule in the same manner as with serrated ferrules.

These split ferrules are excellent for split bamboo rods, or in fact for any rods, and they are often preferred to serrated ferrules. If anything they are neater. They can be purchased of the trade, but any amateur who can work

metal handily can make them from plain capped ferrules.

3. Capped and welted ferrules are of the same form as the two mentioned above, but the caps are plain, as shown in Fig. 14.

In all carefully made German silver ferrules the outside diameter of the female ferrule at *g* (Fig. 14), is identical with the inside diameter

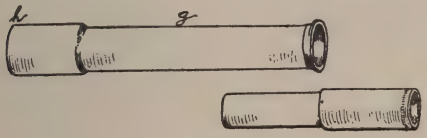

FIG. 14.
Plain Capped and Welted Ferrules.

of the cap at *h*. This is a help to the novice in tapering his joints. This also applies to the center. In purchasing ferrules always specify "capped and welted ferrules, closed-end centers." Some of the centers are left open at the bottom, which is necessary when dowels are to be put in.

I have given preference to capped ferrules for the reason that they are better for the novice to work with than straight ferrules. By straight ferrules I mean those in which the female is a

true cylinder inside and out. Many serrated and split ferrules are made straight, but if they are not to be fastened with pins, they may be set too far down on the wood and work loose more easily if the cementing is imperfectly done. It is possible to obtain straight ferrules which are shorter than those that are capped. For three-joint rods less than six feet in length, by using short straight ferrules, you can slightly lessen the total length of metal in the rod, and if it is to be quite willowy, they are excellent for the purpose. Specify either "welted straight ferrules" or " welted short straight ferrules" in ordering, but in either case add "capped closed-end centers." The use of straight centers will spoil the taper at the joint.

Dowels should be avoided by beginners. The plain ferrules have, through long use, been proved fully equal—and in the opinion of some anglers, actually superior—to doweled ferrules, even for heavy salt water and salmon rods. In this opinion I do not concur with respect to very heavy rods, in which there is abundant space for the dowel without weakening the wood at all. For small caliber rods, however, the

dowel has no advantage over the plain ferrrule. Few amateurs can hope to properly fit doweled ferrules to a rod, the effect being rather to weaken than to strengthen it. The intricate parts of the old-fashioned doweled ferrules may be seen in Fig. 15.

Every ferrule should be fitted with a metal plug, to keep out the dust while it is in its case.

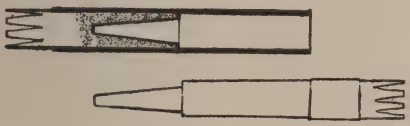

FIG. 15.
Sectional View of Doweled Ferrule.

Waterproof ferrules are well worth their slight extra cost. In these a metal disc is brazed or soldered in the ferrule, to prevent water from getting into the wood or bamboo.

In purchasing a reelseat it is necessary to decide whether the rod is to consist of one piece; of a tip and a separate handgrasp; or of two or three joints of equal length; and in any case whether the grasp is to be single or double.

If the rod is to be one piece, or if the hand-

grasp is to be fitted direct to the butt of a two or a three-piece rod, and is to be single, the reel-seat should be like that pictured in Fig. 16.

If the handgrasp is to be single and separate, then the ferrules shown in Fig. 17 will be needed. Of these, the center goes on the large end of tip and the ferrule fits into the tapered end of the reelseat (Fig. 16). The method of fitting will be described further on.

If the handgrasp is to be double, then the reel-seat is ordered without the tapered end, and a separate taper is required. See Fig. 18. The ferrules shown in Fig. 17 can also be used in connection with this reelseat (Fig. 18), as will be explained in the proper place.

For all single-hand fly- and bait-casting rods reelseats of three-quarter inch diameter are standard, and seven-eighths or one inch for medium weight salt water and salmon rods. In ordering reelseats, the diameter of the small end of taper must be specified. Generally these are 15-32, ½ inch, 17-32 and 19-32 of an inch.

Reelseats for fly-rods are like Fig. 18 with the exception that the bottoms are closed. For this purpose the taper is generally narrower.

FIG. 16.
Reelseat for a Single Hand Grasp.

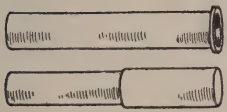

FIG. 17.
Ferrules for a Separate Hand Grasp.

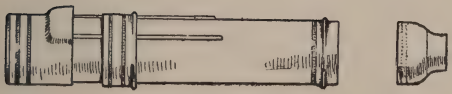

FIG. 18.
Reelseat and Taper for a Double Hand Grasp.

Stock buttcaps are generally of ¾ inch diameter at the large end. For bait-casting rods, which should have rather full grasps, one inch is a better diameter. I like the small hard rubber

FIG. 19.
Agate Guide.

FIG. 20.
One-ring German Silver Guide.

buttons made for tarpon rods, and hollow these out so that they fit as a buttcap. They can, however, be fitted flush against the cork of the handgrasp without hollowing, and fastened on end of grasp with a screw. See Fig. 35*a*.

For light bait-casting rods it is nice to use

FIG. 21.
Agate Offset Top.

a full set of agate guides and an agate top, but if this increases the cost too much use an agate top and an agate guide nearest the reel, with one-ring German silver guides for the balance

of the set. There was a time when it was believed that large guides and tops were best, but it is now conceded that guides and tops of a caliber of 5-16 inch are large enough, safer and neater. There can be no question that large, heavy guides affect the action of the rod. The agate guide shown in Fig. 19 and the one-ring German silver guide pictured in Fig. 20 have proved as good as any so far used. They are

FIG. 22.
Hard Steel Snake Guide for Fly-rod.

light, strong and efficient. The caliber of both is 5-16 inch.

By all means employ an agate offset top made like that shown in Fig. 21. In this there is a wire extending from the tube to the bottom of the metal ring holding the agate, while the two side wires prevent the line from catching around the top, and strengthen it. The caliber is 5-16 inch. The tube may be tapered or cylindrical.

For fly-rods the best guides are of hard steel,

snake form, as shown in Fig. 22. These can be had in various sizes in the trade. In Fig. 23 a steel top for fly-rods is shown. In this the ring is of the same form as the agates used for the same purpose, but the steel ring is made loose enough to turn in the wire that holds it, in order that it will not wear from the constant friction of the line. The wires are lashed to the rod tip with silk. The form shown in Fig. 24 differs only in that these wires terminate in a tube. Wires and tube are German silver.

For guides and tops of fly-rods German silver is too soft and is soon cut in grooves by the friction of the line. Any mechanic can make these loose steel tops, or they can be purchased from the importers. Agate or steel tops, and steel guides, are necessary for tournament fly-rods. The hand guide should also be agate, as during the constant stripping in and shooting of the line it is held at an angle to the rod, causing considerable friction and wear if the first or hand guide is steel.

Novices who have access to machine tools can make guides and tops for both fly- and bait-casting rods of hard steel and of the form shown

in Figs. 19-24 inclusive. Steel is in every way adapted to guides and tops, and if neatly made they are light, strong and durable. Many novices make all of their rod fittings, and some of these are the best I have ever seen. Being unable to purchase steel tops for my single-hand and salmon fly-rods, I persuaded a fellow angler to make several steel tops for me, and these have proved very satisfactory in tournament casting.

FIG. 23.
Steel Fly-rod Top, with loose Ring and Wires.

FIG. 24.
Steel Fly-rod Top, with Tube.

He has also made steel guides and tops for all his fly- and bait-casting rods, and his work shows what a novice can do if he has access to machine tools.

Perhaps the best glue for use in the making of split bamboo rods, and for gluing corks and forms for handgrasps is French glue, obtainable in paint shops. Place the glue pot in a kettle of water over a slow fire. The glue pot

should have wire legs or be elevated slightly, else it will rest on the bottom of the kettle and, the water being excluded from under the glue pot, the glue will burn.

Russian isinglass is also very good, but it should not be used a second time. Instead, clean the pot and prepare fresh glue each time it is to be used. Russian isinglass is colorless and for this reason is used in glass signs and metal work where other substances would show. Order an ounce of it and try it before deciding to adopt it. It costs about forty cents an ounce, but this quantity will be sufficient for several rods.

Much depends on how glue is prepared and used. I prefer the best French glue, soaking it over night and using it very hot, but thin. It sets very quickly but is not brittle. Like all amateur rodmakers, I have made mistakes in handgrasps, etc., and have tried to rectify them by heating, steaming or soaking them, to separate the parts so that the changes might be made. It is at such times that one learns with what obstinacy glue will resist attempts to separate parts joined with it. I have soaked a cork handgrasp for three hours in steaming hot water

without making the slightest impression on the glue, and have experimented with ordinary glue and prepared cements, all of which resisted severe treatment in a manner that surprised me.

There are several prepared cements that are excellent and cheap. All should be warmed, say in a cup of hot water. Most of them can be thinned with vinegar. They are perhaps inferior to the commercial glues that are soaked and prepared fresh each time they are to be used, but their handiness appeals to the novice.

Much depends on how the glue dries in split bamboo. It should not become brittle and break when the rod springs, nor be too sensitive to moisture.

Ferrules can be seated with shellac, glue or various cements. I have found the cement known as Hercules very satisfactory. It is obtainable in the trade in twenty-five cent sticks. A very good article, known as the Fishing Gazette ferrule cement, can be made as follows:

Clear rosin, 1 ounce; boiled linseed oil, 1 teaspoonful; gutta percha, 1 drachm. Melt together, pour into water, and pull.

I have used silk wax with satisfaction made

after a formula given by the late John Harrington Keene. It is as follows:

Best yellow rosin, 2 ounces; white beeswax, sliced, 1 drachm.

Dissolve by slow heat and add 2½ drachms fresh unsalted lard. Stir for ten minutes, pour into water, and pull. It is to be wrapped in a bit of chamois skin and kept out of the dust.

In this, as in the ferrule cement, it is well to rub your hands slightly with vaseline before taking the wax out of the cold water, as otherwise it will adhere to the fingers at first.

Another formula, which is recommended by Colonel R. F. Meysey-Thompson, in his "Angling Catechism," follows:

Powdered white rosin, gum arabic and lanoline, one part each; or two parts rosin and no gum arabic. Simmer together until melted, add a few drops of essence of lemon, pour into cold water, pull and roll until of the proper consistency, when it can be cut into cakes and wrapped in chamois skin. If too soft, add rosin; if too hard, add lanoline. Obviously it must be kept free from dust.

The best colorless substance obtainable for use

in waxing silk thread for winding rods or making artificial flies is mentioned by the late Harry G. McClelland in his excellent little book "The Fly-dresser's Cabinet of Devices." It is made by melting together equal parts (bulk) of amber rosin and turpentine and pouring into collapsible metal tubes such as artists use. When a thread is to be waxed, a little of the liquid is squeezed out of the tube on the finger and thumb, between which the thread is passed several times. The surplus wax is then removed from the fingers with a drop of turpentine. Fly-tyers use this liquid in preference to the silk wax mentioned above, as the latter is more likely to get hard and brittle in time through exposure to the air, and it is difficult to keep it clean and colorless.

You will need a small bottle of the best grain alcohol shellac for coating all silk windings to preserve their original color. This is not to be used on the rod proper, however.

The best varnish I have ever used on rods of all kinds is known as extra light coach. It comes in cans of all sizes fitted with air tight tin caps. It is better to get the smallest size, one-half pint, as when repeatedly exposed to the

air it dries slowly unless thinned with turpentine, and this color makers invariably advise you not to do, as the thinning agency detracts from its good qualities. Instead it should be heated in a vessel of hot water. This varnish is elastic, does not crack, and dries quickly with a beautiful gloss if used while quite warm.

Spar varnish is also good, but several coats of it are required, it lacks lustre, and dries slowly unless exposed to sun and wind.

Purchase a three-quarter inch oval or flat brush of good quality for the varnish, and a thin round artist's brush for the shellac. Both should be washed carefully immediately after being used in hot water and soap, then dried and laid away out of the dust.

Amateur fishing rod makers experience difficulty in obtaining silk of suitable sizes for winding their rods. Those who live in small towns can only obtain size A or larger, which is too coarse for fly-rods and for the slender bait-casting rods used so much in bass fishing and in tournament casting. No silk finer than A is carried by dry goods firms, but in this size every imaginable color and shade may be had.

To be sure some of the fishing tackle dealers carry O and OO in red, green, yellow and black; but if one is particular and asks for a certain shade, the dealer does not always have it, and the next shade may prove disappointing if you happen to have part of your winding finished and desire a shade that will match nicely. The wholesale silk houses will not sell to an individual in small lots as a rule, although they may sometimes condescend to let him have a given number of spools. No amateur could possibly use a quantity of silk, even if he were to wind every one of his rods solidly with it, and after several disappointments he is likely to fall back on A, even if it does finish up in lumps and welts that are not in keeping with the careful work he has put on the other details of his rod.

There is one advantage in size A, however: every little store handling dry goods carries all colors and every shade that will match dress goods of silk, cotton or wool. If you have never noticed this, ask a saleswoman for a spool of green silk, and she will show you a score or more, and every one a different shade of green. No wonder you cannot buy silk by mail that will

suit you, merely by naming a color. How this size can be split and used for all windings is described further on.

In selecting silk there is always the temptation to purchase more than you can ever use or give away, particularly shades that will disappoint you if wound on the rod and varnished. There are certain combinations that do not give the barber-pole effect so many anglers object to, yet are durable as to color. Black is a hideous color for a nice rod, but it looks well as borders for yellow or orange. Some shades of yellow lose all color under the varnish, and cream color becomes semi-transparent, and is often employed for that very reason. Blue, lilac and pale red fade rapidly when exposed to the sun, and purple, often seen on some rods, is not always lasting. Bright or flame red and medium apple green are generally satisfactory, but their brilliancy depends a great deal on what sort of varnish protects them from the wearing of the line in casting —particularly on a fly-rod.

In addition to the winding silk, purchase a tiny spool of buttonhole silk of any color, to be used in pulling the ends of the winding silk through

and forming "endless" windings. Its use is explained in the proper place.

A spool of cotton or linen thread is also handy for use in tying guides on temporarily while testing your rods. If it is waxed it will be much more effective. I use linen for this purpose, fastening the guides in place with it while aligning them, then cutting the thread when the guide is partly fastened with silk.

CHAPTER IV

Tools Needed in Rodmaking

In preparing to make a fishing rod, after the wood and metal parts have been obtained, the next thing to consider is a workbench. If one is not at hand, and you do not know any carpenter or mechanic who will let you use his bench at odd times, a makeshift will answer. If a bit of plank can be laid across a table and secured against wobbling, it will serve.

Of course a large iron vise will be very useful, but if this is not available, one of the little iron vises to be had in hardware stores for a dollar or less will answer very well; in fact, you cannot afford to be without one if you are fond of making and repairing small articles.

The tools you will require are few and simple.

At least two iron planes will be needed, one of medium size and the other very small, say four inches long, for finishing. Get a small oilstone in a wooden case, and never neglect to clean it carefully and wrap it in a cloth after using it, as otherwise its pores will become clogged with

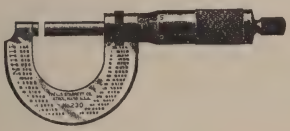

FIG. 25.
Micrometer Caliper.

gummed oil and dust, rendering it worse than useless.

You will need one rather coarse flat file, say fourteen inches long, and a fine flat or three-cornered file, the latter preferred for split bamboo work. Also get a sheet of fine emery cloth; coarse, medium and fine sandpaper; a small, thin saw; a flat steel scraper. A drill stock and several small drills are always useful.

Calipers of some sort are necessary. The best obtainable is the micrometer caliper registering thousandths of an inch, with scales showing

equivalents in 8ths, 16ths, 32ds and 64ths. One of these costs about $4, but its graduations are so fine that it is useful in other work as well as in rodmaking, and is almost indispensable for the angler who wishes to obtain exact calibers of rods, lines, silkworm gut, etc. These calipers are made by several firms, and all are of the form illustrated in Fig. 25. The size which is graduated in thousandths, and will take work up to an inch in diameter, is best for your purpose.

The next best caliper is the one shown in Fig. 26, or a similar device with sliding arm and scale graduated to 64ths and opening two inches. This is the most practical caliper for the beginner, as it is simple and small. Its cost is about $1.50. It has a lock nut and the reverse side gives 100ths of an inch.

A much cheaper gauge is made of brass and boxwood, similar in form to Fig. 26. One of these will answer very well, although the graduations are coarser than those of the other calipers mentioned.

There are several devices that are used by some amateur rod builders which are not abso-

lutely necessary, but they are handy and can be made to take the place of calipers at times.

You will not make your rod a true taper from handgrasp to top, but it will help you to know how to do this, for the tapering of the square stock can be made nearly uniform at first, in the rough.

FIG. 26.

Take a piece of cardboard and draw two straight lines 4½ inches long, 15-32 of an inch apart at one end and 7-64 of an inch at the other. This represents a uniform taper from the handgrasp to the top of a 5½ foot rod. Mark off spaces every half inch to represent every six inch station from handgrasp to top, and number them 6, 12, etc., up to 54. The distance between the horizontal lines at every mark will give the caliber of the rod at that point; that is, the

length of the mark numbered 24 will be equal to the diameter of the rod 24 inches from the handgrasp, if the taper is uniform. Fig. 27 explains the method. To make the diagram handier let the horizontal lines be 9, 18 or 36 inches long, dividing the total into nine spaces of equal length, the result being alike in every case if the distances at the ends are exactly what the rod is to be at taper and top.

Now, take a piece of brass and by sawing first and trimming with a file afterward, form a slot 4½ inches deep, 15-32 inch wide at the top and 7-64 inch wide at the bottom. Every half inch scratch a line across and mark these 6, 12, etc., with a sharp-pointed instrument. This will serve as a gauge for uniform tapering.

If, however, you have decided what the caliber of your rod is to be at every six inch station, you can utilize a piece of brass with ten square notches filed in its edges, the largest being 15-32 inch and the smallest 7-64, every notch to be equal in width to the caliber of the rod at the corresponding station. These can be numbered from 6 to 54 respectively in half feet.

For smoothing off rough places on metal fit-

tings, taking the sharp corners off guides and many other little details, a fine three-cornered file will be very useful. I prefer the needle file because it will fit into a loop in the cover of my fly-book, and it can be used in lieu of a saw on occasion. A file of this sort is about

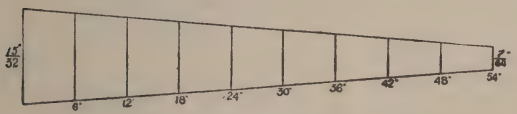

FIG. 27.

six inches long, flat on one side and slightly convex on the other. Its width is about one-eighth inch in the center, tapering to a fine point. Although somewhat delicate, its high tempering prevents frequent breakage, and it can be used on rod fittings without scratching more than with emery cloth.

CHAPTER V

Types of Bait-Casting Rods

To some persons it may seem that while an eleven-foot rod must be nicely tapered and balanced, a rod only half as long, being more or less stick-like, if made a given caliber, will answer. Nothing could be further from the truth. While it is a fact that a rod 5½ feet in length requires less time and material than one of the old-fashioned long bait-fishing rods, it must be even more carefully made, for an error of one-sixty-fourth of an inch in the caliber of butt or tip may render it comparatively worthless. A mistake in the long rod may be hidden in its greater resilience, and this may save it, but reduce the length by one-half and you more than double the work required of each foot.

For a long time after I first began to experiment with the modern bait-casting rods I felt sure that, for an all-round rod one of six feet or slightly longer seemed preferable to those of lesser lengths. Exhaustive experiments with rods of various lengths and with reels and lines, in fishing and in tournament casting have convinced me that if we make our bait-casting rods as delicate, relatively, as our fly-rods, and still retain ample resilience, strength and backbone, 5½ feet seems a very good average length.

Numerous well-known advocates of short rods have arrived at the same conclusion. So well known are they that their advice seems worthy, especially as their conclusions have been proved sound by the vast number of 5½ foot rods used in the national casting tournaments and in bass fishing.

Sometimes it is said that the modern bait-casting rod, like the long bow of merry England, should be proportioned to the owner's height and strength. There may be something in this, but I would hesitate to assert that a six-footer should select a rod of his height, and a man of medium stature one of five feet.

Who was first to advance this theory I do not know, but Alfred Ronalds, in his "Fly-Fisher's Entomology" (London, 1836), said of salmon and trout fly-rods:

"Like the bow of the archer, the rod of the angler should be duly proportioned in dimensions and weight to the strength and stature of him who wields it."

Possibly a short man may get better result with a five-foot rod than with one of six feet, but there is little to recommend any rod shorter than five feet, since it must be stubby if badly proportioned, or weak if of too small diameter. If the handgrasp is less than twelve inches in length, and the taper begins at 15-32 of an inch and is hollow for a short distance, then gradual to the top, with a diameter there of 7-64 inch, the 66-inch rod will be equally serviceable for fishing and for practice in tournament casting. It may well be termed an all-round rod.

In view of these facts, as well as for the sake of brevity and simplicity, I will try to instruct beginners in making bait rods 5½ feet in length. The application of the same principles to the making of rods of other lengths will follow

naturally and fly-rods will be treated separately. Several things must be considered by the beginner before he obtains his rod materials:

First. It is evident that the ideal rod is one made of a single length of wood or split bamboo, with a handgrasp permanently glued on its large end. But while this is particularly true of split bamboo, it does not apply with equal force to wood, as it is more difficult to obtain a slender straight-grained piece of wood sixty-six inches in length and free from knots and other imperfections. Still, this is not impossible.

Second. A rod with only one joint. Such rods are frequently made with a long tip and a separate handgrasp. This is a most excellent type, and rods of this form are very popular. They are more compact than the one-piece rods, and almost if not quite equal to them.

Third. A rod consisting of a butt and a tip of the same length. This is not quite the equal of rods of the second class, but much more handy to make and to carry about. Theoretically the ferrule should not be placed in the middle of the rod; practically a very good rod can be so made. Its simplicity is marked. It

is a very common type, particularly in salt water fishing. I have made several rods, each consisting of one length, and have invariably cut them in two later on, placing the ferrule in the middle, or in the thick part near the handgrasp. Very little difference in the action of these rods, before and after altering, was noticeable.

Fourth. A rod consisting of a butt, a joint and a tip, all of equal length. This is the most common type known to-day, the handiest for carrying, but with its faults. Its ferrules are, in theory, placed to better advantage than are those of the rod of the second class. Practice undoubtedly proves this theory correct. In a rod of 5½ feet, however, the ferrules materially stiffen it at these two points, and it must be very carefully proportioned.

CHAPTER VI

One-Piece Bait-Casting Rods

ASSUMING that you have obtained all the materials needed, we will begin our actual rodmaking, taking the rods as they are given and commencing with one of the first class, as it is the easiest type to make.

As your rod, when finished, is to be 5½ feet long, the agate top adding about ⅝ of an inch, the wood should be slightly more than 5½ feet long, to allow for cutting down finally to 65⅜ inches.

Assuming that your wood is ⅝-inch square and free from knots, plane it a trifle on all surfaces and from both ends, to determine which way the grain runs; and having decided which shall be the butt end, drill two holes through the

wood very close to that end, as shown in Fig. 28, and drive a brad in the right-hand end of your workbench, so that you can hook the big end of the wood over the brad and plane away from it, which is much more satisfactory than butting

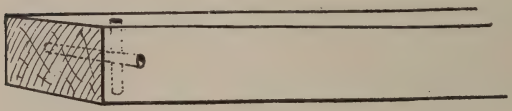

FIG. 28.

the small end of the wood against a cleat at the far end of the bench.

Plane the wood until it is straight and true, the gauge showing that it is ½ inch thick on each side throughout its length. If it is crooked, do not worry, and do not attempt to correct this by planing more off one side than the other. It can be straightened perfectly later on. Mark the exact center at each end with two lines crossing in the center.

If your hand-grasp is to be single, mark a point ten inches from the butt end and continue

the line entirely around the wood. This will allow you to saw off an inch where the holes are, and give you space for a nine-inch hand-grasp. If the grasp is to be double, allow twelve inches, for an eleven-inch grasp.

Begin at your pencil mark and plane carefully and evenly to the tip end on all sides. Use the caliper frequently, noting the diameter every six inches. If there is a thick place, mark it heavily with the pencil and plane that part lightly, then continue to reduce all sides until you have a nice even taper and the small end is 5-32 of an inch thick. Holding the tip end on the floor, exert a slight pressure and note the curve of the whole piece, which should arch nicely, the curve diminishing gradually toward the butt. Turn it, and see if the spring is fairly uniform on all sides.

Now caliper carefully and trim off uneven places until the diameter of both sides is exactly alike at each six-inch station. Use the small plane for this work, setting it very fine.

A piece of board with a groove in one edge, preferably four feet long, is now in order. Pine tongue-and-groove stuff, used for partitions, is

ideal. Its value for other branches of rodmaking will be explained further on. Plane the edge, so that the groove will be shallow at the tip-end, and fasten it in the vise or nail it lightly to the side of the bench. Lay the rod in the groove, with one of the four corners uppermost, and setting your small plane a trifle coarse, take off the corner evenly from butt to tip, ignoring your pencil mark.

Turn to the next corner and plane it, then the other two. Use the utmost care in transforming the strip from square to octagon form, and caliper frequently until it is of exactly the same diameter on every side at each six-inch station. You are now shaping the strip, so that the next step will make it round, and in this stage haste will work sad havoc with later plans. The eye, the caliper and testing the arch must all be depended on at this stage. Every one of the eight sides must be uniform. A perfect strip is illustrated in Fig. 36.

Setting your small plane very fine again, lay the strip in the groove and take off one of the corners the full length. Turn to the next one and remove it, and so on. The rod is now ap-

proximately round, cylindrical in its first foot, then tapering gradually to the small end.

There are various ways to make it perfectly round. One is to lay it flat on the bench, and holding it under the palm of the left hand, roll it backward and forward while sandpapering it with a sheet of that abrasive folded over a block of wood, held in the right hand and moved rapidly up and down the rod. I prefer the flat steel scraper, and turn the rod rapidly while working from end to end, using the grooved board to hold it steady.

Stop frequently and draw the rod through the fingers to locate uneven places. If none are found, go over the rod thoroughly with sandpaper folded and held in the hand without the block. You are now ready for final tapering.

At this stage I take a strip of paper the full length of the rod and draw two parallel lines on it, each 65⅜ inches in length. The upper line I mark "rough calibers," and the lower line "final calibers." Marks are placed on each line to indicate the place where the taper of the hand grasp is to be, then every six inches to the tip end. Lay the rod beside the upper line on your

paper, caliper it at every station, and set these figures down on the corresponding mark. Note then carefully, for if the wood has been planed properly in the square, the tapers will be nearly uniform from hand-grasp to tip-end, but the wood will not, in this form, be properly proportioned for use.

If you were working by rule-of-thumb, without a rod to copy, the only thing would be to put a top and guides on the rod temporarily, fasten a reel on the butt with cord, run the line through, attach a quarter- or half-ounce weight, and try a few casts; but the formula in Fig. 29 will save time. These calibers were taken from several bethabara rods that have seen long use in fishing and practice casting.

If the wood is dagama or greenheart, add 1-64 of an inch or a trifle less to each diameter given. Try the rod before deciding, for the action varies with different pieces of wood, and none can be exactly alike. In Fig. 29 the lower line of figures mark the six-inch stations; the upper figures the final calibers of a bethabara rod. It will be noted that, commencing at the cylindrical butt end, the calibers decrease rapidly to the

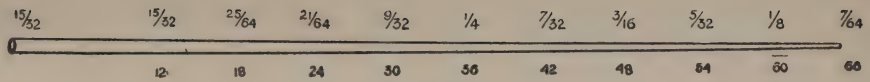

FIG. 29.
Calibers of a bethabara rod.

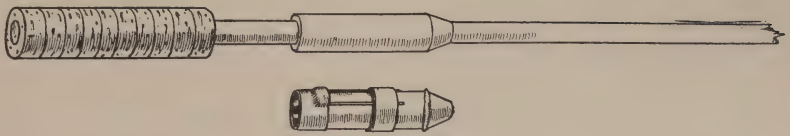

FIG. 30.
Corks in place and sleeve ready to be glued on.

thirty-inch station, then are nearly uniform to a point close to the top.

Mark these calibers on the lower line of your paper, and note the variations between them and the calibers of your rod. Then scrape or sandpaper from your pencil mark toward the tip, gauging often until your rod is very nearly as small as it is to be finally. Now tie on a reel, guides and top and try the rod in casting. If it pleases you, go over it lightly with fine sandpaper and fit the agate top permanently. Use a flat file in tapering the wood to fit the tube snugly. Heat your ferrule cement and coat the wood lightly with it, then heat the tube of the top, push it home and turn it around until the inside is evenly coated with cement.

Measure from agate top to butt and saw the latter at the 66-inch mark. Warm the agate top over the flame of a match and remove it for the present.

Select a number of corks and warm your glue. A piece of thin 15-32-inch tubing is now needed. An old ferrule will answer. File the outside of one end until the edge is sharp. Holding the tube in the center of a cork, with a pad in the

palm of the hand to prevent that end from cutting you, turn the tube evenly until it cuts through the cork like a wad-cutter. The result will surprise you—a nice smooth hole through this seemingly difficult substance to work. Do not, however, try to hammer the tube through the cork.

Drop this cork circlet over the tip of your rod and push it slowly down to the butt, the last inch of which has previously been coated with hot glue. Punch out another cork, slide it down, coat the first one with glue, press them into close contact. Proceed in this manner until you have ten corks on the rod, giving you a handgrasp approximately five inches long.

Now procure a piece of white pine five inches long and ¾-inch in diameter. Bore a 15-32-inch hole through it and round off the outside until it will go inside the reelseat easily. This should be perfectly made, and it may be best to have it turned in a lathe. Taper one end until it will fit the taper of the reelseat nicely, while the other end should lack a quarter-inch of being as long as the reelseat. Slide this pine sleeve down over the rod (see Fig. 30), coat the rod and the uppermost cork with glue, press the pine sleeve home

and put the rod aside for a couple of days until the glue dries.

If you want the handgrasp to be shaped in a certain way and be nicely finished, have it turned in a lathe. I prefer to have mine perfectly cylindrical throughout, and press the reelseat into the top cork, leaving a right-angled shoulder to serve in lieu of a finger hook. I take a piece of sandpaper, folded round a block of wood, and turning the rod rapidly, work back and forth lengthwise of the grasp, gauging frequently, then using fine sandpaper until the grasp is cut down to 1 1-16 inch in diameter.

Taper the lower corks until the buttcap will fit snugly. Warm the buttcap, rub a little cement inside, push it home, and when it is cold drill a hole in it and into the butt of the rod, drive a brass pin home and file it off flush with the surface of the cap. Wipe off surplus cement.

In fitting the reelseat over the pine sleeve, place the hooded end down, so that in fitting the reel to the seat the band will pull down and in this way bring the reel near the hand, so that the index finger will grip the cork shoulder and render your control of the reel and rod firm.

If the yoke of the reel fits the seat as it should, and the band is tight, the reel will never work loose, even in a long fight with a big fish.

The three-quarter inch commercial reelseat is about 4½ inches long, and for bait-rods the correct way—in theory, at least—is to fit it with the sliding band at the bottom, so that the band will push forward over the reel-yoke and counteract the tendency of the reel to work loose in playing a fish. Fitted with the hood on the upper end of the reelseat, the reel goes so far forward that more than an inch of the seat is exposed, and the right hand must grip this metal instead of the firmer and less slippery cork or cord wound grasp; hence, the shape of a well-formed grasp counts for less than it should.

If the handgrasp is single, the length of the reelseat does not so much matter, but when the grasp is double I prefer to cut the reelseat down to a length of 3¾ inches, and also file the after end of the reel-yoke until its length is only 2½ inches. This brings the reel nearer the hand, and also places the upper grasp where the left hand can rest on it in spooling the line.

Formerly I made all my bait-casting rods with

double handgrasps, but have finally arrived at the conclusion that for tournament casting the upper grasp is a useless thing that serves only to stiffen the rod at that point. I always grasp the reel in spooling line and in playing a fish, holding the reel with three fingers of the left hand, while the index finger and the thumb spool the line. Making the grasp single and short adds to the resilience of the rod and makes it neater, and easier to build. I always place the hooded end of the seat down, and if the band is wedged tightly over the yoke, as it should be, there is no play. A great many sea and other rods are made with the hooded end down.

See that the yoke of your reel is standard. Formerly every manufacturer made yokes as best suited his fancy, but some twenty years ago the National Rod and Reel Association adopted three standards for reel-yokes. The smallest, ¾-inch, was cut on the arc of a ten cent piece; for ⅞-inch reelseats, a nickel; and for 1-inch reelseats, a silver quarter. Nearly all manufacturers follow these gauges.

Assemble all the parts of the reelseat and push it down over the pine sleeve, working it well

into the topmost cork, to form a waterproof joint. If the taper fits the tapered end of the pine sleeve, remove the seat, coat the sleeve with cement or glue and push the reelseat home. A brass pin through the hooded end and reelseat will fix the metal parts of your handgrasp rigidly. This pin should merely enter the wood of the rod, but not penetrate far, or it may weaken it. I prefer to use two very small brass camera screws, one on each side of the hood, and two of these instead of one pin in the buttcap. They are not so likely to work loose as is the case with pins. They should be ⅜-inch long.

Now, go over the rod with the finest sandpaper, wet the wood to raise the grain, let it dry, then cut it down with a bit of well-worn fine sandpaper, polish diligently with shavings from the rod, and finally rub with silk paper until you secure a high gloss. Replace the agate top, rub the rod with coach varnish on a rag, and suspend it on a brad in an airy or sunny place free from dust until it is dry. If it is crooked, let it hang with a heavy reel in place.

Tie the guides on with cord, attach a reel, and practice with the rod until you are satisfied—

either that it suits you or that it needs reducing a trifle in places where it seems too stiff. If the latter use fine sandpaper, sparingly.

Just here it is well to quote the late Major Traherne who, in "The Badminton Library on Salmon and Trout," said of the greenheart salmon rod:

"I am at a loss how to describe it, but its virtue lies in an equal distribution of strength, in proportion, from the butt to the point. A heavy butt, with no spring to it, and with a weak top, is of little use for casting purposes beyond a certain distance. The spring should be felt, to a certain extent, to the bottom of the butt when casting; and I consider a rod which does not possess this quality of little or no value."

This applies to all rods, whether for lure or fly-casting; but in finishing the bait-rod it is well to remember that for quick, snappy casting the taper from the middle to the tip-end should be more rapid than in a rod intended for slow, even casting with light lures, and for accuracy casting. In this the taper may be rapid for a short distance, then slow to the tip, giving greater

resilience to the whole rod, but retaining strength near the handgrasp.

Several trials should satisfy you with the rod. If it is reduced in places, finish as before, with the final coat of varnish rubbed in. This thin coat serves as a protection under the silk windings, which, as will be explained in the proper place, are put on without wax. You are now ready to wind and varnish the rod.

If you decide to wind the grasp with cord, procure one of the pine single grasps which cost about twenty cents, and trim it to fit the reelseat snugly, tapering at the forward end to fit the metal taper. Slide it down over the rod and glue it in place. When dry form a shoulder at the bottom so the cord will end there, as shown in Fig. 31, and wind with cord. The cord should be covered for a quarter-inch at the butt by the cap, and for an equal distance at the other end by the reelseat. The latter is put on in the same fashion as with a cork grasp.

If you wish to make a double cork grasp, the reelseat and taper shown in Fig. 18 are necessary. In this case the corks for the lower grasp are followed with a pine sleeve a quarter-inch

shorter at each end than the reelseat. This is cemented on and another cork pressed down until it butts against the sleeve and is pierced slightly by the upper end of the reelseat. More corks are glued on until the desired length of the small upper grasp is attained, then the glue given time to dry. The cork is then worked down, tapering forward until the small metal taper finishes it off. This is cemented lightly in place.

A double grasp, cord wound, requires more care. It is first necessary to obtain a pine grasp, bored through. These come in the shape shown in Fig. 32, and much longer than necessary. Saw in the middle, fit, and wind the lower grasp, try the reelseat and cut off the cylindrical part of the grasp so that the joint will come under the reel, rather below the center. Attach the reelseat permanently and fit the upper grasp, making it fit snugly, but allowing for the thickness of the cord to be wound over it. Now wind a dozen turns of cord over the upper grasp (see Fig. 33) and try it, removing the cord and taking off a little wood until it will butt against the other end under the reelseat. Replace the cord, coat the rod and inside of grasp with glue and

FIG. 31.
Cord-wound pine handgrasp.

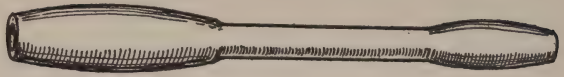

FIG. 32.
Pine handgrasp, double.

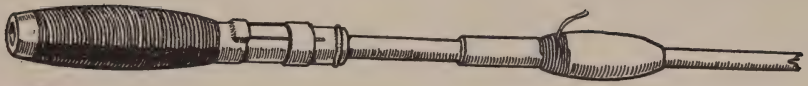

FIG. 33.
Upper grasp ready for gluing in place.

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push it home. Continue the winding until the upper grasp is covered, then tie off and fit the taper (Fig. 18) snugly in place.

These cord-wound grasps should be given two coats of shellac and one of coach varnish as soon as they are dry. It must be remembered that small cord, when varnished, is somewhat slippery when wet, and large cord harsh to the hand. If the size is equal to that of D or E silk line it will make a good grasp.

I prefer the cork grasps for many reasons, among them being the ease with which they can be made after one has had a little practice. Cork must be humored, as it were. If you find that sandpapering the grasp lengthwise does not result in a velvety finish, secure the rod in a vise after wrapping it with several thicknesses of cloth, and with a long strip of the finest sandpaper, go over the grasp just as a bootblack does with his polishing cloth, turning the rod occasionally. You will soon learn to impart a nice finish, and this will prove that you can, on a pinch, get along without the use of a lathe.

CHAPTER VII

One-Piece Bait-Casting Rods with Separate Handgrasps

To make a rod of the second class, in which the handgrasp is to be single and nine inches in length, the wood for the tip, inclusive of the agate top, will be approximately 58½ inches long, as the ferrule center on the large end of the tip will enter the handgrasp ferrule about 1½ inches. These ferrules should be 15-32 of an inch in diameter and of the type shown in Fig. 17. The large end of tip is marked for a distance equal to the small end of the center, and the wood carefully reduced with a file until it will enter the center snugly to its very end, as illustrated in Fig. 34. The center is then cemented on, and the tip is ready for its rubbed coat of varnish and the winding. Obviously this tip is to be made of the same diameter as

rods of the first class—described in a preceding chapter—save that it begins to taper at the ferrule.

Rods of this class are not always made with two tips, but this can be done by purchasing two centers to fit the ferrule in the hand-grasp. By making one tip as described above, and the

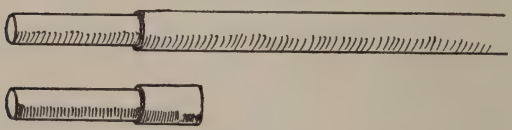


FIG. 34.
Large end of tip, shouldered to fit a capped ferrule center.

other one with a rapid or hollow taper for six inches above the ferrule, then gradual to the small end, practically two rods will be the result. One tip can be stiff, for distance casting, and the other one more willowy, for accuracy or light lure casting—a very useful combination. I have made a tip of this sort from bethabara which will cast a quarter-ounce lure nicely, and is so well proportioned that it is a pleasant rod to fish with. The dimensions

follow, and may be compared for reference with those given in Fig. 29. The center is 15-32 of an inch, and the wood tapers quickly at first, to 23-64 at the six-inch mark; at 12 inches, 21-64; 18 inches, 19-64; two feet, 17-64; 2½ feet, 15-64;

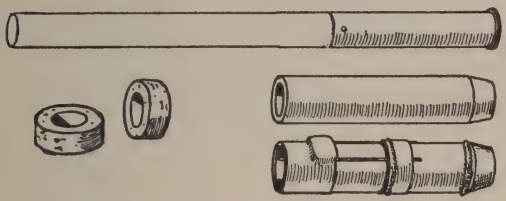


FIG. 35.

Ferrule riveted on wood core of hand-grasp, pine sleeve ready to be glued on, and reel-seat and corks for grasp.

three feet, 13-64; 3½ feet, 11-64; four feet, 5-32; 4½ feet, ⅛; 58½ inches, at the top, 7-64 of an inch.

A separate single hand-grasp can be made as follows: Fit the ferrule (Fig. 17) on a piece of light but springy wood like spruce, dagama or greenheart. This must be rounded nicely and the ferrule seated on it just so that the center

will not touch the wood. Cement and rivet the ferrule on to the core, fit a pine sleeve over the wood and the ferrule, with forward end of sleeve tapered to fit a reel-seat like that shown in Fig. 16. Now try the reel-seat, and when it fits snugly, with its lower end extending a quarter-inch below the pine sleeve, glue the sleeve on the wood and the reel-seat on it, and rivet or screw the reel-seat in place.

Slide a perforated cork forward over the wood and work the end of the reel-seat into it until it butts against the end of the sleeve. Glue this cork in place, following with others until the total length of grasp, inclusive of reel-seat, is nine inches, when the wood core is cut off and the cork finished and fitted with a butt-cap. A hand-grasp of this form will never come apart if properly made. Its parts are anchored at both ends.

If to be cord-wound, the pine grasp is fitted over the wood core and ferrule, the taper placed over the ferrule and the grasp fitted to it, as in Fig. 35. Beginning at a point that will be covered by the after end of the reel-seat, the grasp is wound a few times with cord and the

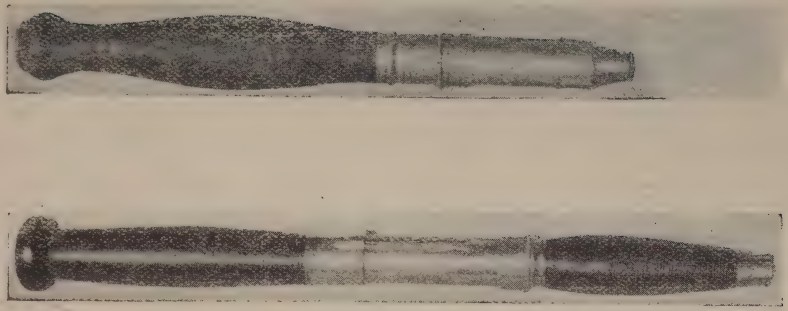


FIG. 35A.

A cork single hand-grasp and a cord-wound double hand-grasp.

reel-seat fitted over it. The core is then coated with glue and the grasp pushed forward until the reel-seat and the tapered end of the grasp fit closely, when the winding is resumed and tied off at the shouldered butt end. The butt cap and reel-seat being riveted in place, this separate grasp is ready for shellac and varnish.

If to be double, and cord-wound, the forward grasp is first fitted over the wood core, the taper (Fig. 18) pushed up against the welt on the ferrule, and a few turns of cord wound on the tapered end of the upper grasp, then this grasp glued in place on the wood core, with the winding covered by the taper. Continue to wind down to the cylindrical part, fit the reel-seat and glue it on, wind a few turns over the lower grasp, try it and finally glue it in place, then wind to the shouldered butt end and fit the butt cap. The two parts of the pine grasp abut inside the reel-seat, as illustrated in Fig. 33.

CHAPTER VIII

Two-Piece Bait-Casting Rods

For a rod consisting of two pieces of equal length, it is well to begin with a butt three feet long and 5/8-inch square, and two tips, each three feet by 3/8-inch. If the taper is to be the same as in the rod of the first class, the only extras will be a 17-64 inch ferrule with two closed-end centers, one for each tip. The tips will taper from 17-64 to 7-64 inch.

Naturally the beginner would make the butt first, whereas I advise him to make the tips first, for this reason: The offset and tube tops are not all of the same length, and if it is desired to make all pieces exactly the same length, the tips should be finished first. This applies especially to three-piece rods, in making which it is difficult for the beginner to figure correctly on the separate parts; for the length of the tip

is added to when the top is put on, and each of the ferrules adds something, so that it is hard to get all pieces of the same length without wasting time trying and cutting until all are correct. I give exact lengths for each piece, but if it is desired to make the rod longer or shorter than five and one-half feet, it must be remembered that the trimmed tip shown in Fig. 38 is slightly more than one-half the total length of the rod, for the reason that the ferrule on the butt adds 1¼ inches to the actual length of the wood; hence the wood in the butt must be slightly shorter than the wood in the tips, in order that all parts will be the same length when completed.

Extreme care must be exercised in fitting the centers on the tips, as the least uneven place will force the center out of true alignment, and this applies to the ferrule, too. It is also easy to break a tip in sandpapering. When the tips are finished (see Fig. 37) they will be 33 inches in length and 33¾ when fitted with centers and tops, as shown in Fig. 38. When polished for the last time, they should be rubbed with varnish and suspended.

FIG. 36.
Tip planed to octagon section.

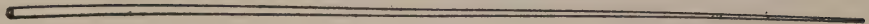


FIG. 37.
Tip ready for mounting.

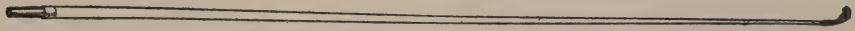


FIG. 38.
Tip fitted with center and top.

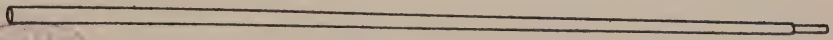


FIG. 39.
Butt joint finished and ready for hand-grasp and ferrule.

One of the common bevel-gear drill stocks, with a chuck large enough to take a ¼-inch drill can be made to serve you in a way its manufacturers probably never thought of. This tool is made with a revolving wheel and handle on one side, for the right hand, and a stationary knob on the other, for steadying with the left hand. Remove this knob and fasten its spindle in the vise, wheel and handle on top. The chuck will take one of your tips, but do not close it too tightly. Turn the wheel with your left hand and polish your tips with a bit of sandpaper held in the right hand, moving forward and back very rapidly, to prevent circular scratches. If the tip is springy, be very careful as you approach its small end, for with this makeshift lathe you may snap off the end if you happen to let the sandpaper slip and catch it.

By fitting a wood plug into the ferrule and securing the other end of the plug in the chuck, you can polish the butt or joint of your rod, but it is advisable to have some one else turn the wheel while you support the rod with one hand and polish with the other. This of course applies to tips, too.

Split bamboo tournament rod with cylindrical cork hand-grasp.

Bethabara casting rod.

Jucara Prieto casting rod with double cord-wound hand-grasp.

FIG. 40.

The butt of your rod will be 32½ inches long when ready for ferrule and hand-grasps (see Fig. 39). It will taper from 15-32 at the forward end of grasp to 19-64 at the ferrule, the cap on this ferrule being 1-32 of an inch larger than the cap on its center.

At first the tip may seem too heavy, but it must be remembered that it should be heavier in a wood rod than in one of split bamboo, and that whereas many split bamboo tournament rods are made with very little resiliency in the butt, the wood rod, when the tip is placed on the floor and pressure applied, should show a nice arch for more than half its length from the tip, while there should be quite a bit of spring below the ferrule. There is no fixed rule for determining how much to take off the butt. Testing it repeatedly will be the best plan, but if it still seems too stiff, the diameter of the butt must be reduced with the greatest care, else you may go too far. Placing the ferrule in the center of the rod requires more care in trying it out than if there are two ferrules—as in a three-piece rod—but practice with reel and weight will satisfy you.

When the taper of the butt joint suits you, the grasp is put on as described in Chapter VI., the wood is finished as described for the tips, rubbed with varnish, and it is then ready for winding. It is made without pins through ferrule and centers, as will be noted. Pins keep the ferrules in place, but unless put in by an expert, they may weaken the wood where it needs strength, and good cement may be depended on. At most a ferrule may work loose, but it is merely necessary to warm it temporarily to secure it until it can be removed and put back with new winding or a little more cement.

All of the best rods are equipped with pinned ferrules, and they seldom work loose. But these are fitted by expert workmen, aided by the finest machine tools. As I am writing from the beginner's point of view, I advise cement only. Should a joint be broken while you are far from home, there is no troublesome pin to pick out. Instead, you warm the ferrule, push out the broken wood and set the ferrule on a freshly fitted part.

CHAPTER IX

Three-Piece Rods

THE most common type known is the three-piece rod, the separate parts of which are of equal length. The angler who must go far afield for his fishing demands a rod that is compact, just as he wants a take-down gun in the autumn. The difficulty experienced in traveling in trains and street cars, as well as in walking through crowded streets argues against unwieldy parcels, and the fly or bait rod must be made in lengths convenient to carry. The rodmaker might argue until doomsday in favor of long-joint rods, claiming better action, greater strength, etc., but he could never persuade his patrons that these qualities outweigh the greater handiness of short joints.

This being true, the rodmakers place the joints where they will affect the action of the

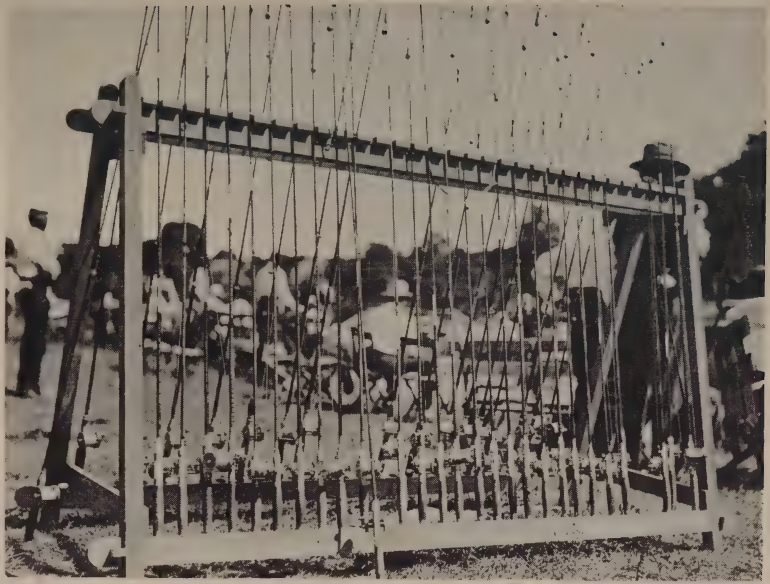
rods the least; namely, in two places, making even an 11-foot fly-rod conveniently portable when taken down. They carry this practice to the longest salmon rods, which are nearly always made in three joints, proving that no maker likes to place ferrules in the middle of the rod—which is necessary in making a four-joint rod. The principal exceptions are the short two-piece salt-water rods, which are more or less stiff throughout their length; and the short bait-casting rods.

In a 5½-foot bait-casting rod of the necessary caliber, two ferrules make the joints very short, and the stiff metal is actually about one-eighth the total length of the rod. Aside from the fact that the ferrules in short three-piece rods are placed to better advantage, the rod made in two pieces of equal length is to be recommended. Certainly it is almost as easy to make two of this type as one with three joints and an extra tip. When the three-joint rod is to be made 6 or 6½ feet long, however, its advantages increase with its length.

In a 5½-foot rod made in three pieces of equal length, and of the caliber given in Fig.

29, the ferrules will be 21-64 inch, with one center; and 13-64 inch, with two centers, for the tips. The tips when completed and fitted with tops, will be 22¾ inches long and will be tapered from 13-64 to 7-64. Finish these first. It is well to bear in mind that you cannot make each of the other two joints one-third of the total length of the finished rod, for the reason that the tip is to be pushed one inch into the ferrule of the middle joint, and this in turn 1⅛ inches into the ferrule on the butt joint, while these two ferrules add to the actual length of the two lower parts.

A more difficult problem in division and addition it would be hard to find. The first time I tried to make a rod of three pieces of equal length I almost gave it up in despair, for despite what I thought was exact calculation, the separate parts would vary or the total would be too great. Finally I drew a pencil mark on the floor just 5½ feet long, and sitting down, puzzled the problem out by placing the three parts of the rod, with the ferrules beside them, on the line, and measuring until the adjustments were correct.



A FEW BAIT-CASTING RODS.
The Rod Rack at one of the National Tournaments

The actual length of the middle joint will be 21¾ inches, for the top or female ferrule will extend 1 inch beyond the wood, making this joint 22¾ inches when it is finished. Taper the wood from 21-64 to 15-64, it being remembered that the cap of the ferrule is slightly larger inside than the caps of its centers. Cement the ferrule on the small end of the middle joint and the center of the butt ferrule on the other end.

The wood of the butt joint will be 21½ inches long, as the ferrule adds 1¼, making its total length 22¾ inches. Taper it from 15-32 at the pencil mark, indicating the upper end of the handgrasp, to 11-32, to fit the cap of the ferrule, which is 21-64 at the small end.

You are now ready for the handgrasp, the various forms of which are described in preceding chapters. Careful testing is necessary before this rod can be finished, for different pieces of wood vary considerably, and it is seldom one can make all the tapers just what he expects to. The two lower joints may need fining down until the action suits you, and in some rods I have substituted 19-64 for the 21-64

inch lower ferrule, making a hollow taper from handgrasp forward a few inches, then uniform taper to the first ferrule.

If the rod is to be six feet long, which will make it much sweeter for fishing and accuracy casting—its three joints considered—the ferrules should be 15-64 and 21-64. One of my favorite bethabara rods is 5 feet 10⅜ inches long and it is a very pleasant rod to fish with. Its ferrules and calibers are the same as those given above.

CHAPTER X

Split Bamboo Rods

Few amateurs attempt to make split bamboo rods because they believe the work is too complicated. It is at once a difficult and yet a very simple proposition, as will appear later on. Good material properly worked up will give you a first-class rod. Patience and perseverance are necessary, for the preparatory work requires great care, and the least slip of plane or file may ruin an otherwise perfect strip.

You cannot copy a wood rod in bamboo, for aside from the fact that they are essentially different in every way, you can always measure the exact diameter of your wood rods, but must measure the "flat" surfaces of the hexagonal bamboo, and these do not give true calibers. Neither can you hope to determine

its calibers in the professional way. Long experience tells them where a rod needs strength, and where it should be tapered rapidly. Even in examining one of their rods you will not notice the slight variations at certain places, which seem trivial to you, but are the result of burning much midnight oil and trying, altering, testing to attain perfection.

In making each of the strips you halve the actual caliber, but only approximately. Finally, you must work very slowly. If you finish six perfect strips of whatever length in a day you will work faster than you should. Remember that you cannot use your split bamboo rod as soon as finished, as you can a wood rod. Therefore, go slow.

These remarks are not intended to discourage you, but rather to make you cautious. The first time I actually finished six strips of bamboo and began to glue them, my hands trembled so that the work was very poorly done; for I had been told that I could not do it, and I half expected them to fly apart despite the excess of glue on the strips, on my hands and on the floor. As a matter of fact you will be delighted—just as I

was—and the result will be much more satisfactory than you anticipate.

If you decide to use Calcutta, select several canes 1¼ inches or more in diameter at the large end, having in mind the fact that the burns must not penetrate the enamel. Pound each piece smartly on the floor and examine closely for worm holes, and the dust from them. Cut the pieces at least a foot longer than the finished joint is to be. Split them through the eyes where the leaves grew, for this part is worthless. An old table knife will serve the purpose. This will leave about two-thirds of each cane from which to make selections. Split up enough to give you six good pieces, and plane two sides of each strip, leaving it nearly equare in section. Keep in mind the fact that the rind or enamel is not to be touched with any tool. In squaring up the strips approximate the taper of each one, but otherwise do not disturb the pith side.

Examine each strip carefully for worm holes, and if there is the slightest indication of these in it, break it up. Worm-eaten bamboo is the bane of the rodmaker.

File the knots slightly and lay the strips side by side, rind up. Now note the burns again, and if any of them char the enamel, reject that strip and try another one. Next try the strips which contain the leaf eyes, bending them in every direction and noting the arch as well as their inclination to set. If they will not spring back straight, particularly when the rind is on the convex side of the curve, they may not be properly seasoned. If faults appear in these rejected strips, examine their mates, which you propose to use, but do not subject them to severe strains. The weeding out of poor material, if it is done at this stage, may save time and labor later on. See that the bamboo has no greenish hue, indicating that it is not seasoned. It should be yellow and split far ahead of the knife blade.

If six strips pass inspection, place them so that no two knots will be opposite or even near each other, saw off the ends and mark all of the strips, so that they cannot be reversed by accident. Dipping the butt ends in red ink is a good plan. Number them from 1 to 6 on the rind side. They should be some three inches

longer than the finished joint is to be, so that you will have leeway in trimming the ends.

Sharpen your plane on an oilstone until its edge is very keen. Bamboo requires the utmost care in planing, and a dull tool must not be used on it. Set the plane very fine and test it on a rejected strip of cane. It is well, too, to put an old glove on your left hand while you hold the cane in place in planing and filing it. A slip may result disastrously, for the rough edge of a triangular strip of cane will make a jagged wound.

If your material is Tonkin cane, the same rules laid down for Calcutta may be applied to it.

You will now prepare to bevel two sides of each one of your strips, to make its section triangular, with the apex exactly opposite the center of the enamel base, and the angle formed by the two sides to be 60 degrees, as illustrated in Fig. 44.

There are "forty-'leven" ways to do the rough beveling, and as many more methods employed in finishing the strips. You can begin to bevel the strips in the grooved edge of a tongued-

and-grooved board. Another way is to nail a strip of wood near the edge of your work bench, forming a right-angled rabbet. Some rodmakers use a hardwood block with rabbets cut in two corners. Still another plan is to prepare two blocks like those illustrated in Fig. 41, with the angle of the groove 60 degrees.

I like the grooved board referred to in the chapter on "One-Piece Bait-Casting Rods." You can procure a piece about four feet long and keep it handy. It is serviceable for rounding wood rods, for squaring bamboo strips, which lie well in the groove; and for the preliminary beveling of these strips. This piece of board, and the hardwood block illustrated in Fig. 42, will answer all your requirements in split cane work.

Some amateurs, however, like to use blocks similar to those illustrated in Fig. 41. To make these, procure two pieces of seasoned hardwood. Cherry, birch or maple will be better than oak; beech will answer. Make the blocks four feet long, 2 inches wide and 1½ inches thick. Plane off the corners as indicated by the dotted lines in Fig. 41. Plane very carefully,

a little at a time, then fasten the two blocks temporarily in the vise while you test the groove with the handy little gauge illustrated in Fig. 43. This is a center gauge costing twenty cents at hardware shops, and it not only has three 60-degree notches, but scales graduated in 14ths, 20ths, 24ths and 32ds of an inch. As it is tempered steel, you can true up the

FIG. 41.

groove with it and with a three-cornered file from which the handle has been removed. Both the gauge and the file have angles of 60 degrees. The depth of the groove does not so much matter as its shape, for on this depends the character of your finished strips.

When satisfied that one of the grooves is correct, fasten the two blocks securely with at least four screws, reverse and true up the other groove.

We will assume, for the sake of brevity and simplicity, that your first groove is to be for the rough beveling of the strips of the butt joint of a two-piece rod, whose diameter at the large end is to be 15-32 of an inch, and at the small end 9-32. We will also assume that the depth of the groove is uniformly ¼-inch from end to end. Secure the block against shifting and plane its face until the depth of the groove at one end is 15-64 and at the other 9-64 inch. To be certain there are no uneven places, test with a straight edge, both lengthwise and across the block, then mark its entire face with a pencil.

The depth of the second groove will range from 9-64 to 3-64, assuming that the tip end of your rod is to be 3-32 inch when finished.

Now place a squared strip of cane in the large groove of your block, with the rind at one side, and take off a very fine shaving with your plane. Turn the strip and plane the other side, being careful to go over the knots with a shearing motion, else the plane will "bite" into the knots. See that you do not take off any of the face of the block, which you marked with pencil for this purpose.

By this time your strip will be roughly triangular, but the edges should not be sharp. Take up another strip and bevel it in the same fashion and so on until the six strips are ready for the finer work.

Turn the block over and bevel the strips for the

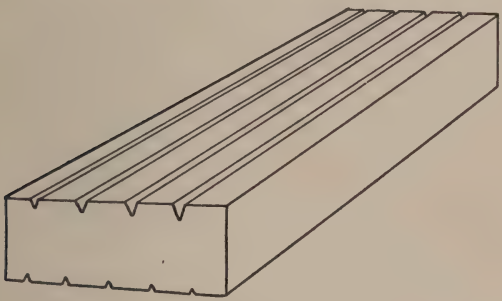


FIG. 42.

tips in the shallow groove, then lay the block aside. Some amateurs finish their strips in grooves of this sort, but it is so difficult to make a perfect groove of this length, and to prevent the strip from rolling, that the following method is the better one:

For this purpose procure a block of hard

maple, birch or beech, two inches thick, 2½ inches wide and six inches long. Make it fast in the vise and with a pencil draw four parallel lines from end to end. With a saw cut shallow grooves on these marks. Take up your three-cornered file and cut the first groove. Its bottom will be slightly round, as the edge of the file is rather blunt, but you can true up the groove with the point of your steel gauge (Fig. 43). Cut the first groove 15-64, the second 13-64, the third 11-64, and the fourth 9-64 inch deep. In this work the utmost care must be exercised to keep the top side of the file level with the surface of the block, to keep the angles of the groove perfect.

Turn the block over, draw four or five lines as before, groove them with the saw, and file the grooves. (See Fig. 42.) Make the first one ⅛-inch deep, the second 7-64, the third 3-32, the fourth 5-64 and the last one 1-16 inch deep. These are for your tips, which require the greatest care; therefore the grooves may be safely made uniform in depth and you can shift steadily to a smaller groove as you file from the large to the small end. Cover both faces of the

block with pencil marks, to assist you in keeping the file out of contact with the block.

Fastening this block in the vise with the larger set of grooves up, begin with one of the strips for the butt of your rod. Lay it in the largest groove with the enamel at one side, and commencing at the butt end, work your flat file for-

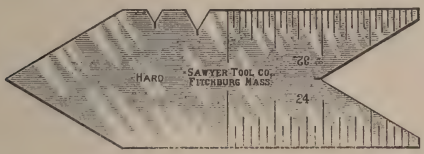


FIG. 43.

ward and back, being careful to hold it parallel with the face of the block. Turn the strip often, in order that you may be sure to keep the angles true, and go from groove to groove until the strip is reduced evenly throughout its length, beginning again in the largest groove and continuing as before, until the strip will lie in the groove flush with the surface of the block, no matter which side is uppermost. Do not attempt to file across the grain of your strip, as it will

sliver if you do. The plane cannot with safety be used in finishing strips. The proper tool for this is the flat file.

Test all angles of the strip frequently with the little steel gauge, going from end to end, filing, testing, sighting along the strip, blowing the dust out of each groove before laying the strip in it.

Proceed in like fashion with the other strips, each one of which must be an equilateral triangle in section; that is, excepting the convexity of the rind side. In other words, the apex of the triangle must be exactly opposite the center of the enamel base, as in Fig. 44, and the angle formed by the two pith sides 60 degrees. Each of the edges must be sharp, and in order to make them so, be careful that you do not raise a sliver at the enamel edges, and in removing it destroy the perfection of the glue joint.

Turning the grooved block over, take up your strips for the tips. Even greater care is necessary with them, for they run so small at the tip end that the least error will ruin one. Use the gauge frequently. Do not be satisfied with a fair strip; make it perfect. Keep in mind the

fact that you cannot use the rod for several months, anyway, and that a day more or less in finishing strips will not matter.

I have said split cane rodmaking is both difficult and simple. If you will be careful and patient, the difficulties will be overcome. Could anything be more simple than this little block of hardwood, which you can carry in your

FIG 44.

FIG. 45.

FIG. 46.

pocket, and which is easily made, yet is in fact a mold for all the strips of your rod? Despite all the advances in toolmaking and in labor saving devices, some of the most expert rodmakers use this little hand-made block of wood.

By the time you have finished the six strips for the tip of your rod, you will have acquired great respect for the six-inch block. In a block the full length of a strip the tendency of the latter to roll is very aggravating, but in the

short block this is greatly reduced, although not entirely overcome, it being difficult to hold even this short length against rolling when the enamel side is convex.

It must be understood that one set of grooves will serve for a long one-piece rod, for one part of a two-piece rod, or for one part of a three-piece rod, provided their number and depth are properly regulated. The angle for all is the same, and the notches in your steel angle gauge will be correct for testing all strips.

There are many other methods employed in beveling and tapering strips, as I said before, but the simplest one is given here, for if the beginner is confronted with a complicated system involving planes fitted with bevel blocks, adjustable "shooting boards," taper gauges and protractors, he cannot be blamed for shying from this interesting branch of rodmaking.

When your strips are finished, their glassy surfaces may seem to be poor holding ground for glue, and you may be tempted to roughen them. This is a mistake. To satisfy yourself, wet one of the surfaces slightly and after it has dried, pass your finger over it. You will find the

grain raised enough to prove that this will be taken care of by the hot glue.

Fit a set of six strips together and wind them spirally with thread, so that they will all be in perfect contact. Examine all parts carefully and see that the pith sides come together throughout, and that no strip sinks below its proper plane, as it will do if its taper is not the same as that of the other strips. In this case a new strip must be made to replace it. Cheap rods are often corrected for this fault by winding a narrow piece of paper spirally around the imperfect place in the strip, then removing the paper from the surface after gluing, but this is not to be recommended, as you would regret it later on, perhaps by the seam opening. Gauge carefully the taper of the assembled strips and mark all places that need further reducing.

In a preceding chapter I said that double enamel rods are excellent if carefully made. In working thin-walled cane this system has some points of excellence, and the amateur who is skilled with the plane and the file can work it nicely, especially for butts and middle joints.

Square up the rough stock and match two

strips with reference to the knots. Decide which is to be the surface strip and plane it to rectangular section, with the rind on the bottom. Do not touch the rind. Now plane the second or inner strip to match, but file off just enough of the center of the rind to make a glue joint, it being remembered that the convex rind of the inner strip cannot otherwise be glued to the pith side of the outer strip. Glue the strips together, wind with cord, place under a weight or clamp together until dry. In section your double enamel strip will be like Fig. 45, while Fig. 46 shows the sectional view of a finished strip. It is best to make the outer strip thinner than the inner one, as in this way the maximum of rind is obtained.

It must be understood that in filing the rind of the inner strip, only a very small portion of its center is to be removed. This will affect the strip very little when the two are glued together.

It is not advisable for the beginner to try this method on tips until he has mastered the less complicated hexagonal work, if at all.

When your assembled strips are ready for

gluing, warm them while heating the glue, and for each set of strips have ready a piece of strong thread. You can glue the strips with another person's assistance. To do this glue a few inches at a time, your assistant keeping them separated for the purpose. Wind them spirally, glue a few more inches, wind again, and so on until finished, then wind back to the place of beginning. Whatever the method, pass the strips over a flame before pressing them into contact, in order to be sure the glue is hot, and after the strips have been wound in one direction they can be again passed over a flame, then the reverse winding completed. I prefer to use the best French glue, applying it with a flat brush while very hot. Before using fresh glue I soak it over night in cold water. It should be quite thin.

Now sight along each strip alternately and correct the natural tendency to twist spirally. Rolling in the hands while gluing will partially correct this. Fasten the glued stock on a board or a rod by winding loosely around both, to prevent warping.

Glued joints should be left in a warm room

until thoroughly dry. A month is not too long, and the best rodmakers dislike to let rods go out of their shops if the stock has had less than four months to dry and harden. As a rule they glue their stock in the autumn and make up rods from it the following spring, these rods being kept out of the anglers' hands for six months at least. Tournament rods should season even longer, for they are put to the severest tests.

Since the above was written I have received from P. S. Redfield, of Providence, R. I., a veteran angler, some suggestions that are practical. He says:

"If you will pardon me, I would like to make a simple suggestion as regards gluing split bamboo for rods. As you know, all labor is lost and bitter disappointment follows if the gluing prove defective. After various failures in gluing bamboo strips together, it occurred to me to devise some simple but sure method of gluing and the following glue-pot was invented. Get a piece of common speaking tube—such as were formerly used in houses to call the kitchen girl to the chambers or dining room. One inch in diameter

is sufficient and 2½ feet long. On one end solder a piece of brass or copper three inches square for a base, and it is ready for the thin, hot glue that has been freshly prepared in a sauce-pan set in another dish of boiling water. The glue should thus be well cooked—say an hour—stirring frequently with a thin wood paddle.

"Enough glue should be thus prepared to about fill the tube. Now set the thing in a teakettle of boiling water and the glue will keep hot—a very important thing for success—till you glue all your pieces. When through using, and while the glue is hot, empty the tube and rinse well in hot water till perfectly clean of glue, dry and hang bottom up for further use.

"Too much care cannot be taken to prevent rusting this tube—as rust and dirt will spoil glue —and so much depends on the gluing.

"I need not tell how to use this glue-pot, as you have already given directions to have the pieces for each joint wound spirally with coarse thread. It will be well to unwind a few inches at a time, commencing at the small end. As the piece is unwound, and pushed down in the glue,

it will act like an egg-beater and consequently glue all surfaces. When half of a piece has been thus unwound and whipped in the glue, wind the thread back, pressing the strips together and the glue out; then unwind the other end to a little beyond where the glue reached before, thus surely gluing every part; then rewind and have a rag handy in a dish of hot water to gently wipe most of the glue from the outside of the joint. Do not wipe too clean, for if a little glue is left on the thread all the better, and no trouble will be found in taking off the winding."

Remember that no matter how perfect your glue joints are, if your gluing is badly performed your work will be wasted. It is folly to attempt to glue strips in pairs, then glue and assemble the three pairs. As your object is to get all the glue possible into your joint, then get all of this out that can be excluded by winding tightly with cord, the best way is to glue and wind, glue and wind until you finish the joint, always heating the applied glue before winding. Thick glue simply cannot be used. I found this the most difficult part of split cane rodmaking—at first, but I practiced on short strips until I mastered the

work, and in this way learned how to properly glue the longest strips. Tips are the most difficult to glue, as they are so small it is at first hard to prevent twisting them in gluing. If this occurs, however, or if the joint is crooked, correct it, after the windings have been removed, by heating and twisting or bending until the joint is straight.

When the stock is dry the double spiral windings are taken off and the surplus glue removed, then the bamboo is rubbed very lightly with the finest sandpaper and the corners rounded slightly. It is then ready for handgrasp and ferrules. I prefer to rub lightly with varnish and let this dry before winding. Split or serrated ferrules should be used on bamboo rods in preference to the ordinary capped ferrules, and in fitting these only the corners of the bamboo should be removed.

To recapitulate: In order to lead from step to step without a break I have tried to describe how the butt and tips of a two-piece rod may be made. It naturally follows that a three-piece or a one-piece rod is made in the same fashion, the depth of the grooves in your little block

varying to accord with the caliber of the rod-to-be.

I would, however, advise you to make several experimental sections of cane before attempting full length strips; in other words, to practice with short pieces until you master first principles.

In order to do this, make your six inch block (Fig. 42) first of all. Take some rejected strips a foot or two in length and bevel and finish them with great care, having in mind a certain taper and following this religiously. It is surprising how quickly this will teach you the niceties of the system. The short pieces will be handy to fit and glue together, and later on you can saw them in two and inspect their ends to see just how your work turns out. You can also determine which glue seems best. Go even further and keep these sample pieces to see how much you have improved in your work from time to time.

CHAPTER XI

Salt Water Rods

THE best type of rod for salt water fishing is the long tip and separate handgrasp. This applies to all rods used in sea fishing, whether for tarpon, tuna, striped bass, weakfish or small fry, the length and weight depending on the kind of fish angled for.

By using the separate handgrasp, the joint can be made very strong, and tips of different caliber or length are available, one handgrasp serving for a part of two or more rods.

Two-piece rods, with the parts equal in length, come next. Other styles are used occasionally.

Bethabara is the favorite wood and split bamboo is coming into more general use for weakfish rods and even for larger fish, including tuna and tarpon.

It has long been the practice to equip heavy salt water rods with two sets of guides, so that any inclination of the tip toward set can be corrected by turning it half way round and using the other guides, etc. There are objections to this, due to the possibility of the line catching on the lower guides, and among anglers for big sea fish there are many who favor one set of guides only. The strain of trolling, and of fighting and landing heavy fish on a long line will permanently set any tip, but this can be corrected now and then so that the fault is not important.

I will give the specifications of three salt water rods I have made at various times, the material of all being bethabara, and each being a useful type. They are illustrated in Fig. 47.

TARPON ROD.—Length, 6 feet 10¼ inches; tip, 5 feet 5¼ inches. Handgrasp, 21 inches, wound with celluloid and fitted with a rubber button. Swell of handgrasp, 1 11-32 inches. Reelseat, 1 1-16 inches in diameter. Taper of tip, 29-32 to 5-16 inch, uniform throughout. Caliber of agate stirrup-tube top, ⅜ inch. First set of

trumpet guides, 9 inches from top; second set, spaced 14 inches; third set, spaced 17 inches; set of agate hand guides, 25 inches from reel. The weight is about 24 ounces.

Surf-Casting Rod.—Length, 6 feet 11½ inches; tip, 4 feet 11¾ inches; handgrasp, 25¼ inches long, or 22½ inches to center of reel. Swell of grasp, 1 3-16 inches; material, a greenheart 17-32 inch core, covered with solid cork, making a very light as well as springy butt whose core is of the same diameter as the tip, of which it is really a continuation. Reelseat, ⅞ inch, fitted for a 250-yard reel. Tip calibers: ferrule center, 17-32 inch; 6 inches forward, 17-32; 12 inches, ½; 18 inches, 15-32; 24 inches, 7-16; 30 inches, 13-32; 36 inches, ⅜; 42 inches, 21-64; 48 inches, 9-32; 54 inches, 17-64; at top, ¼-inch. Top, stirrup-tube, 5-16 caliber; raised agate guide, 10½ inches from top, with the second guide 14 inches below the first and 36 inches from the reel. Guide calibers, 5-16 and ⅜ inch.

This rod weighs only 13 ounces. It was designed for the regulation 2½ ounce lead weight in long distance tournament casting, but will

also handle a 3 or 4 ounce sinker nicely, this weight being necessary in casting in the surf, where the combers will pick up a lighter weight and carry it into shoal water. It also has tremendous power for its weight, and is resilient throughout its entire length, in which it differs from rods having heavy, stiff handgrasps; is a pleasant rod to fish with and one can cast a 2½ ounce weight 175 to 200 feet with very little effort. The grasp is made in the manner illustrated in Fig. 35, but the core is largest under the reel, then tapers to about ⅜ inch at the butt, making it in fact a double-tapered rod.

The grasp is so light that tips of small caliber and length are available, but for all-round sea fishing the handgrasp should be made about six inches shorter.

Light Salt Water Rod.—Length, 6 feet ⅝ inch; joints, 36⅞ inches. Weight, 13 ounces. Handgrasp, double, cord-wound; length, 21 inches; swell of lower grasp, 1⅛ inches; of upper grasp, 1 inch; diameter of reelseat, ⅞ inch. Taper, handgrasp to ferrule, uniform, 35-64 to 29-64; ferrule center, 7-16 inch, caliber

Tarpon Rod.

Surf Casting Rod.

Light Salt Water Rod.

FIG. 47.

of tip six inches from center, 13-32; 12 inches, 25-64; 18 inches, 11-32; 24 inches, 21-64; 30 inches, 9-32; at top 15-64 inch. Top, stirrup-tube, agate, 5-16; bell guide, 9½ inches from top; second guide 5-16, agate, spaced 17½ inches and 27 inches from reel.

This rod is pleasant to use for medium-sized sea fish, and handles the standard 2½ ounce weight nicely. In one of the tournaments of the Anglers' Club of New York in Central Park five contestants used this rod, the best cast with it being 190 feet.

The details of construction for similar light weight wood rods, already given, will apply to these salt water rods, save that heavier material will be needed. For my tarpon rod I obtained bethabara 1 inch square; for the surf rod, ¾ inch; for butt of two-piece rod, ¾ inch, and for tip ½ inch.

In making handgrasps for rods of this class, I leave the wood core somewhat rough, in order that the glue will have better holding ground than if the core were polished smooth.

Merely to give an idea of the expense, in time and cash, to the amateur rodmaker, I give be-

low the following data relating to these three rods. All are bethabara:

Tarpon Rod.—Cost of material, about $7.50; time required, ten hours.

Surf Rod.—Cost of material, about $6; time required, about seven hours.

Light Salt Water Rod.—Material, $4; time, nine hours.

If the surf rod is made of dagama, purchased in billet form, the cost can be reduced somewhat. The time given above refers only to finishing and mounting the rod, and does not include winding and varnishing.

CHAPTER XII

Bass and Trout Fly-Rods

If the beginner is determined to make an all-wood fly-rod before attempting to build one of split bamboo, the directions previously given for three-joint bait rods will apply here, with the exceptions that the joints must be made somewhat longer, the taper slower, and the reel-seat is placed below the hand. Straight-grained bethabara makes a nice fly-rod of medium weight, and dagama works well.

It is scarcely advisable for the novice to begin his rodmaking on a split bamboo trout fly-rod of light weight, for the tips run so small that one can hardly expect to do creditable work on them at first. But bass fly rods of 6½ or 7 ounces are easier to build, and after you have had some experience with butts and joints, tip

making will not present insurmountable difficulties.

Below are given the calibers of three typical fly-rods that are excellent for fishing. They have seen hard service. All are hexagonal bamboo. The handgrasps are solid cork, the hand guides agate, the other guides of steel, snake-pattern, and the tops loose steel rings:

Heavy Fly-Rod.—Length, 9 feet 8 inches; weight, 7 ounces. Joints, 39½ inches long. Grasp, 9½ inches long, inclusive of ¾ inch reel-seat. Ferrules, serrated, waterproof, 21-64 and 13-64. Calibers: at taper, ½ inch; 12 inches from butt, 7-16; 18 inches, 13-32; 2 feet, 25-64; 2½ feet, ⅜; 3 feet, 23-64; 3½ feet, 11-32; 4 feet, 5-16; 4½ feet, 19-64; 5 feet, 9-32; 5½ feet, 17-64; 6 feet, ¼; 6½ feet, 15-64; 7 feet, 3-16; 7½ feet, 11-64; 8 feet, 9-64; 8½ feet, ⅛; 9 feet, 7-64; at top, 5-64 inch.

Medium Weight Fly-Rod.—Length, 9½ feet; joints, 38½ inches. Weight, 6 to 6½ ounces. Grasp, 9½ inches; reelseat, ¾ inch. Ferrules, serrated, waterproof, 19-64 and 3-16. Calibers:

butt joint, at taper, 13-32; 1 foot from butt, 25-64; 1½ feet, 23-64; 2 feet, 11-32; 2½ feet, 21-64; 3 feet, 19-64. Middle joint, 6 inches, 19-64; 1 foot, 9-32; 1½ feet, 17-64; 2 feet, 15-64; 2½ feet, 7-32; 3 feet, 13-64. Tips, 6 inches, 11-64; 1 foot, 5-32; 1½ feet, 9-64; 2 feet, ⅛; 2½ feet, 7-64; 3 feet, 5-64.

Trout Fly-Rod.—Length, 9 feet; joints, 36½ inches. Weight, 5½ ounces with ¾-inch metal reelseat; with reel bands instead, a little less than 5 ounces. Grasp, 9 inches long. Ferrules, serrated, waterproof, 9-32 and 11-64 inch. Calibers: butt joint, at taper, 7-16; 1 foot from butt, 25-64; 1½ feet, 11-32; 2 feet, 21-64; 2½ feet, 5-16; 3 feet, 19-64. Middle joint, 6 inches, 9-32; 1 foot, 17-64; 1½ feet, 15-64; 2 feet, 7-32; 2½ feet, 13-64; 3 feet, 3-16. Tips, 6 inches, 11-64; 1 foot, 5-32; 1½ feet, ⅛; 2 feet, 7-64; 2½ feet, 3-32; 3 feet, 5-64 inch.

Ordinary sumac, obtainable in any thicket, is nicely adapted to use for light handgrasps where reel bands are to be used. It is greenish-yellow when varnished, but can be stained nicely to resemble cedar or cherry, then varnished.

Split-Bamboo Trout Fly-Rod.

Split-Bamboo Bass Fly-Rod.

FIG. 48.

Tournament fly-rods are allowed ¾ of an ounce for metal reelseats; therefore a rod just under 4¾ ounces will be admitted to the four-ounce class, and one just under 5¾ ounces to the five-ounce class if each has a metal reelseat. The length limit is 11½ feet.

Five-ounce tournament rods are usually 10 feet long and much stiffer than rods made exclusively for fishing, but they are pleasant to fish with, particularly on windy days, with a heavy double tapered line.

Heavy single-hand tournament rods that are admitted to the open-to-all trout fly contests are limited only in length, to 11½ feet, but may be any weight. In the East these seldom weigh more than 10½ ounces and are generally 11 feet long, but in the West 11 feet 5½ inches is a favorite length and some rods weigh as much as 13 ounces. These are extremely stiff, and they are powerful enough to lift 100 or more feet of heavy oiled silk tapered line out of the water on the back cast.

The grasps are 12 to 15 inches long, and the rods taper from about ½ inch at the grasp to 7-64 at the top, with long and heavy split or

serrated ferrules. These vary in caliber, but are about ⅜ and ¼ inch in diameter. The middle joint is heavy and tapers very little at the lower end.

CHAPTER XIII

Salmon Fly-Rods

Since the earliest days of fly-fishing, salmon fly-rods have been made of solid wood, and to-day, although split bamboo is largely used for all other fly-rods, there is a steady demand for solid wood salmon fly-rods. In Great Britain greenheart salmon rods are still the favorites with a vast number of the anglers, and it is likely wood rods will never be entirely replaced by those of split bamboo for salmon fishing.

In America the demand for salmon rods is small, for comparatively few of our anglers go to the Northern and Northeastern waters for these noble fish, and while those who prefer split bamboo rods for trout and bass fishing often wish to use rods of the same material

for salmon, a great many favor wood rods. For tournament casting I prefer split bamboo to wood in all rods, but split bamboo salmon rods are very expensive and a well made wood rod will give its owner a great deal of satisfaction. Furthermore, it is not so difficult to make as some of the thinner fly-rods.

In a rod whose length ranges from thirteen to eighteen feet and with a weight of 23 to 32 ounces or more, stiffness in the rod requires muscle in the angler. To wield a stiff bamboo rod of 25 ounces and a long and heavy line during several hours' fishing taxes the angler's strength more than does a whippy rod of greater weight, and this is one reason why wood rods are peculiarly adapted to salmon fishing. A nicely proportioned wood rod has good action and with it a fly can be cast and fished with less exertion at ordinary salmon fly-casting distances than is possible with the stiffer bamboo rod, hence anglers of small stature and average strength are likely to favor wood rods.

Again, the split bamboo rod does not begin to work until a certain length of line is extended; that is, it requires the pull of a long

line to make the rod spring properly. Without this spring the fly cannot be cast neatly at any distance. Have you ever tried to cast a fly with a stiff bait rod? You have sufficient power in the rod, but lack the weight of line that is necessary to get the snap that sends the line in a rolling loop through the air. Try as hard as you like, you will never be able to cast a fly ten yards. The wood salmon rod is proportionately as flexible as the whippiest trout rod, therefore but little muscle and weight of line are necessary to develop its spring, and its user can cast lightly and sweetly at fifty feet or one hundred—for the rod does most of the work.

In salmon fishing rods, great power is not of vital importance, for any one of these rods is capable of handling 100 to 125 feet of double tapered line, and that means that they can be depended on to kill the biggest salmon. It is essential to kill these royal fish on the rod and to gaff them only after their fight is ended; therefore a nicely balanced wood rod will answer, it being conceded that bamboo will be less likely to give way to the accidents that may occur on any game fish stream.

Salmon fly-casting has grown more and more popular among the clubs that practice fly-casting as a pastime, and men who have never seen a salmon river and probably never will see one have become adepts with the salmon rod and its heavy line and leader. It appeals to many who do not care for the contests with four and five-ounce trout fly-rods, and it is an exceedingly fascinating game.

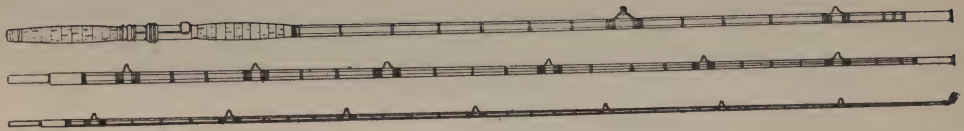
For a long time the maximum limit to the length of tournament salmon rods was placed at eighteen feet, but recently this was changed and the limit placed at fifteen feet. This is in line with the desire to use lighter tackle, and it also enables salmon fishermen to use their thirteen, fourteen and fifteen foot fishing rods in tournaments, placing them on fairly even terms with contestants whose rods are made for distance casting only, but which would be rather stiff for all-day angling.

Of all the fly-rods, the salmon rod is the easiest one for the novice to build from solid wood, and there is no reason why he should not get excellent results from such a rod constructed for use exclusively in what is termed

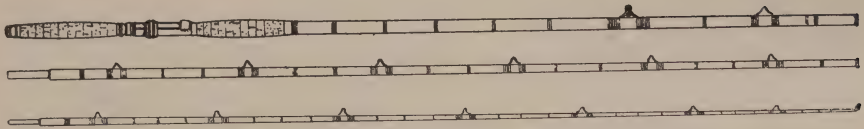
tournament casting; in other words, all casting for practice or for record.

I give the specifications of three salmon rods that I have used with satisfaction in tournament casting, and these are illustrated in Fig. 49.

Split Bamboo Salmon Rod.—Length, 14 feet 11½ inches; joints, 5 feet 1 inch; weight, 26 ounces; material, six-strip Calcutta bamboo. Handgrasp, double, 24 inches long, solid cork fitted to bamboo direct. Length of lower grasp, 7 inches; diameter, 1 3-16; buttcap, 1 1-16; reel-seat, 6 inches long, 1 inch in diameter; upper grasp, 11 inches long, diameter, 1 3-16. Calibers: 24 inches from butt, at taper, 41-64; 30 inches, ⅝; 3 feet, 39-64; 3½ feet, 19-32; 4 feet, 37-64; 4½ feet, 35-64; ferrule, capped, welted and serrated, 4½ inches long. Middle joint: Ferrule, 3⅝ inches long, 17-32; 6 inches from bottom, 17-32; 12 inches, ½; 18 inches, ½; 2 feet, 31-64; 2½ feet, 15-32; 3 feet, 7-16; 3½ feet, 13-32; 4 feet, ⅜; 4½ feet, 11-32; ferrule, capped, welted and serrated, 3⅜ inches long. Tips: Ferrule, 2⅝ inches long, 21-64; 6 inches, 5-16; 12 inches, 19-64; 18 inches, 9-32; 2 feet, 17-64; 2½ feet,



Fifteen-foot Split-Bamboo Salmon Rod.



Fourteen-foot Bethabara Salmon Rod.

FIG. 49.

15-64; 3 feet, 13-64; 3½ feet, 3-16; 4 feet, 11-64; 4½ feet, 9-64; at top, ⅛ inch. Tops, loose ring, steel. Guides: First, agate, 5-16; balance hard steel snake guides, fifteen in all.

Bethabara Salmon Rod.—Length, 14 feet 11 inches; joints, 5 feet; weight, 28 ounces. Hand-grasp, double, 24 inches long, other dimensions same as split bamboo rod. Calibers: 24 inches from butt, ¾ inch; 30 inches, 45-64; 3 feet, 43-64; 3½ feet, ⅝; 4 feet, 19-32; 4½ feet, 9-16; ferrule, capped and welted, 3¾ inches long. Middle joint: Ferrule, 2⅝ inches long, 17-32 diameter; 6 inches, 17-32; 1 foot, 33-64; 18 inches, 33-64; 2 feet, ½; 2½ feet, 31-64; 3 feet, 15-32; 3½ feet, 27-64; 4 feet, 13-32; 4½ feet, 25-64; ferrule, capped and welted, 3¼ inches long. Tips: Ferrule, 2 inches long, 23-64; 6 inches, 11-32; 1 foot, 21-64; 18 inches, 5-16; 2 feet, 19-64; 2½ feet, 9-32; 3 feet, ¼; 3½ feet, 7-32; 4 feet, 3-16; 4½ feet, 5-32; at top, ⅛ inch. Top, loose steel ring. Guides, same as above.

Bethabara Salmon Rod.—Length, 14 feet; joints, 57¼ inches; weight, 25½ ounces. Hand-

grasp, same as on other rods. Calibers: 24 inches from butt, 51-64; 2½ feet, 43-64; 3 feet, 41-64; 3½ feet, 39-64; 4 feet, 37-64; 4½ feet, 37-64; ferrule, capped and welted, 3¾ inches long. Middle joint: Ferrule, 17-32; 6 inches, 17-32; 1 foot, 33-64; 18 inches, ½; 2 feet, 31-64; 2½ feet, 15-32; 3 feet, 7-16; 3½ feet, 13-32; 4 feet, 23-64; 4½ feet, 11-32; ferrule, capped and welted, 3¼ inches long. Tips: Ferrule, 21-64; 6 inches, 5-16; 1 foot, 9-32; 18 inches, 17-64; 2 feet, ¼; 2½ feet, 15-64; 3 feet, 7-32; 3½ feet, 13-64; 4 feet, 11-64; 4½ feet, 9-64; at top, ⅛ inch. Top, loose steel ring. Guides, one agate, balance steel snake ring, fourteen in all.

CHAPTER XIV

Winding Rods

This subject has been kept for a separate chapter, in order that the various steps in rod-making can be clearly understood, and to avoid repetition. Winding is a part of the work that can be done at odd moments, on a rainy day or in the evening, though I would not advise night work with colored silks, so trying are they on the eyes.

Let us assume, then, that you have finished a rod—its type does not matter, as the winding is similar for all rods—and that it has been rubbed lightly with varnish and suspended until absolutely dry.

The first things to consider are the guides. If the bait-rod is for accuracy casting or for fishing, the hand guide—the first one above the

reel—will be placed nearer the reel, and more guides will be used than on a rod intended for distance casting only, on which two or three guides will be used. For fly-rods the position and number of guides depend upon its caliber and length.

Take up the guides one by one and file the upper edges of the bases, so that the silk will not be cut by them in winding; then, with a few turns of common thread, tie each one on the rod and true them all up by sighting through them from both directions. To assist in their alignment tiny shallow holes should be drilled in both ferrules, so that in putting the rod together it is merely necessary to seat the ferrules with the two marks opposite in order to align the guides perfectly. This applies to all rods.

On bait-casting rods for tournament work alone, it seems best to use only two guides, so that the hand-guide must be three feet or more from the reel, the distance between it and the second guide being slightly more than the distance between the second guide and the agate top, in order to insure the least possible friction on the line.

If you are particular to have the windings as handsome as possible, putting them on without wax will tend to preserve their color, if they are carefully coated with shellac before varnishing. On a rod whose preliminary coat of varnish is still a trifle soft, yet not tacky, unwaxed silk will adhere nicely when it will not on hard varnish. Provided the silk is treated with absolutely colorless wax in clean hands, it will keep its color fairly well, but after the first two or three windings are put on and coated with shellac, the tyro will understand why dark shades of silk cannot well be used. For example, dark green silk, waxed but not shellacked, will turn almost black under the varnish, and red turns a dull shade. Wax causes the silk to grip the wood firmly and it waterproofs the wood in places where there is only one coat of varnish.

A split cane rod, properly made and cemented, can be used without windings, provided it is not exposed to actual soaking. Following this line of reasoning, some rodmakers hold that winding a rod does not strengthen it materially. This may be true of rods whose windings are

spaced 1½ or 2 inches apart, but if these are placed one inch or less apart, they do strengthen the rod. A rod that is soft in action can be stiffened by close windings or by winding continuously from end to end in spirals, provided the latter are not put on solidly.

If you are in no hurry it is well to make the windings on the butt of split cane rods narrow, say twelve turns each, but space them not further than 1¼ inches apart, with six or more windings ½ inch apart next to the ferrule. On the joint make the spaces one inch, with a similar cluster next the ferrules, and vary those on the tip from ¾ to ½ inch. I am a firm believer in closer windings near the ferrules, to stengthen the strips there against damage in twisting—not that ferrules should be separated in any other manner than with a straight pull.

It is safe, but not always advisable to wind in spiral form, provided the spirals are not so close together as to come under the descriptive term "solidly wound;" for while solid winding strengthens a rod, it also renders it soft in action, loading it down with a non-resilient sleeve filled with varnish.

I do not advocate continuous spiral winding, but I believe in stiffening a rod in this manner if the need arises. The plan I have followed with satisfactory results is to start winding in the usual way, but after completing ten or a dozen turns, instead of cutting the silk and pulling the end under, I follow the "band" by winding spirally—each turn about 1-32 of an inch from the next one—for an inch or more, then winding solidly ten or twelve turns, followed by another inch or two of spiral winding, and so on to the first guide, where the silk ends. Another series of bands and spiral windings is begun on the opposite side of the guide, ending at the second guide, or the ferrule, as the case may be.

This spiral winding calls for two or three coats of varnish, which should fill the interstices between spirals, so that the surface will be entirely smooth, as otherwise a knock or rough handling will break the single strands of silk. The bands alone are coated with shellac.

As previously stated, I have great faith in the conclusions arrived at after long experience by Frederic M. Halford. He advocates winding

fly-rods closely, from one-half to three-quarters of an inch apart. In his opinion this increases the steely spring of a split cane rod and strengthens wood rods appreciably. He does not state how wide these windings should be, but it is asumed that they are narrow, say seven threads in width, since wide ones are unsightly.

When your rod is ready to be wound, your hands being perfectly clean, lay on your work table a small spool of buttonhole silk, the silk to be used in winding, a bit of wax, a pair of small scissors, and a very sharp knife. From the buttonhole silk cut a piece four inches long, wax it, lay the ends together and draw it through the fingers until it will lie straight with the looped end ready for use. We will call it the pull-through.

It is assumed that your silk is not waxed, and that you take up the butt joint of your rod, the first winding to be put on just above the metal taper of the handgrasp. Lay the silk along the rod, hold the end with the left thumb and begin the first circlet toward the right, turning the rod toward the left meanwhile. This will bind

the end of silk, as shown in Fig. 50. Turn the rod slowly toward the left with the left hand, holding the silk tight in the right hand, which guides it. Draw the silk as tight as possible during the first three turns, so that it will adhere to the rod.

If you wish to make ten or twelve circlets, after the sixth one lay the pull-through (*d* Fig. 51) along the rod, loop toward the left, and wind over it, as shown in Fig. 54; but if the winding is to be a narrow one, the pull-through should be inserted at the beginning. This step is illustrated in Figs. 51 and 52. Count each complete circlet, at least at first, in order that all windings will be uniform. At the end hold the wound silk under the left thumb, cut it within an inch of the thumb, tuck the end (*b* Fig. 52) through the loop of the pull-through and draw the latter under the winding, the end of silk following as in Fig. 53.

When the pull-through is free, pull on the end (*b*) of winding silk until it is tight, then shave it off even with the winding and cut the original end (*a*) even with the last circlet of silk. (This is often cut after the fifth or sixth circlet)

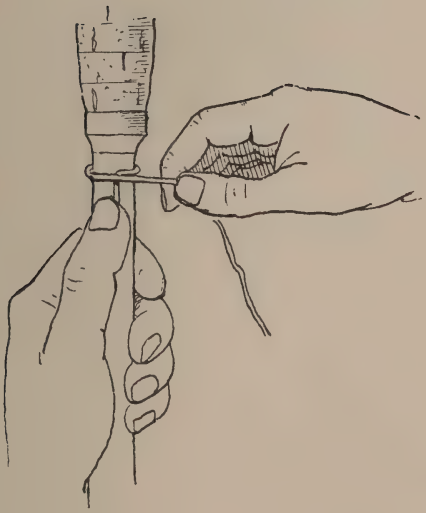


FIG. 50.

Fig. 55 illustrates the method employed in making a narrow border of say, red, for a wide band of say, green. The figure shows the wide green band finished and the first stage in winding the border. In this case the original end of silk (*a* Fig. 53) is not cut off until the border is finished, as it helps to hold both bands together. The pull-through is inserted at the beginning of the border winding, and used in the same manner as illustrated in Fig. 53.

This method of manipulating rod windings is the simplest one of several for making so-called endless windings. It is capable of numerous variations, and it is not only easy to learn, but insures satisfaction.

The secret of the method is to keep the pull-through of buttonhole silk well waxed, and to discard it for a new one whenever it shows wear.

In all books on rodmaking more complicated forms of winding are described and illustrated. The first step is alike in all of these, but their authors describe the finishing step in other ways. The most common form consists in laying the winding silk along the

rod, so that long spirals can be passed over the end of the rod and drawn taut, then the silk is pulled under in the same way as described by me, save that no separate pull-

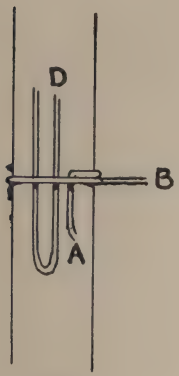


FIG. 51.

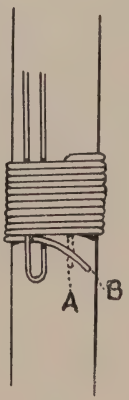


FIG. 52.

through is employed. If one is winding near the middle of a long joint, this method is tedious in the extreme, and the silk not only snarls up, but becomes frayed. There is a way to partially overcome this, which consists in first winding backward in long spirals, passing

the end under these, winding tight, then pulling the silk under; but it, too, is tedious.

Many years ago I discarded these methods for the separate pull-through, and have used it in all windings since then. It may be ancient, but I have never seen it described in any work on fishing tackle. It is, however, one of the most useful of all wrinkles, and is particularly handy in splicing silk lines. With this pull-through fancy windings of only two or three turns of silk can be so neatly made that only after minute inspection can the blind ends of the silk be seen. Indeed, I have had anglers assert that such windings had been pasted down with shellac, and only after inspecting them with a magnifying glass were they convinced that the silk ends were actually pulled under and cut off.

I have examined split bamboo tournament rods in which the lower strips had given way through hard usage, but the narrow bands of silk had held so firmly that they were all ruptured at the line of the break, the ends remaining unmoved. This also shows the strength of silk windings, however narrow.

Different persons wind rods differently. My

way may not be the best one, but I will describe it. I begin with the butt joint and place a rather wide band of say, green, with a narrow

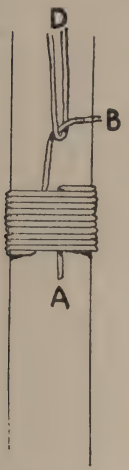


FIG. 53.

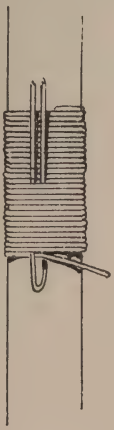


FIG. 54.

FIG. 55.

red border next to the handgrasp taper, then a similar band on each side of the ferrules and at the top. After that I wind the guides with say, green, with narrow red borders. This leaves only red silk to finish, and enables you to

evenly divide the remaining spaces to be wound. The space between the handgrasp and the first guide is measured. Mark off every 1¼ inches from the guide down, and if you like finish up with eight or ten five-turn windings just ahead of the first band at the taper, for ornaments. Wind the red bands, then mark the spaces between the two guides, or hand guide and ferrule, wind there, and so on. So long as all spacing is uniform, any necessary variations will not be noticed, but as a general thing make the spaces closer and closer toward the tip, and if there is a separate tip, place its guides and windings so that it will match its fellow tip.

At first one is inclined to make his windings wide, believing that they are handsome so; but as they are not necessary, it is well to make them all ten or twelve turns, with still narrower ones next to the wide bands covering the guides, and at the ends of the joints. Red being a lasting color, it is well to use it thoroughout, with light or medium green for borders. All red without ornaments requires much less work, but is not so neat as if there is some relief. If you object to colors, use cream or light

yellow silk, which will hardly show on bamboo or dagama. For bethabara red is standard. Green alone or as a predominating color lacks taste, although it comes out well for narrow borders with red. At one time I happened to see a spool of lilac silk while winding a rod, and tried it. It looked so neat at first that I used it throughout the rod, using apple green for borders. The rod was a good one, but I couldn't stand those colors, and gave it away to a fisherman in Canada. Somehow the colors "got on his nerves," too, and he in turn gave the rod to an uncle whose vision was poor. I trust the old gentleman does not consider it a hoodoo rod, as his nephew and its maker did.

There is a sort of unwritten law among rodmakers to use heavy winding silk on large rods, and so on down to the finest silk for light fly-rods. It is well to follow this rule as far as may be possible. On tarpon, heavy salt water and trolling rods, on salmon rods and on the butt joints of heavy fly-rods size A is the proper thing. It is the commercial size that can be obtained anywhere. Size O is suitable for joints, and size OO for tips of most rods, while for

four and five-ounce fly-rods OO is best. One reason for this is that on tips the heavier silk is likely to be cut through by the line as it shoots through the guides in casting the fly, whereas the finer silk windings may be unaffected. On tournament fly-rods, when the line is coiled on a platform that is covered with grit, it is not unusual to see the windings of tips cut through as if with a dull knife.

As stated in a previous chapter, smaller sizes of silk than A are difficult to obtain of the retail trade, but there is a way to so utilize A silk that it will answer every requirement, with a lasting supply always at hand in the nearest dry goods store. This method follows:

Having selected the colors desired, wind the guides and ferrules—if the latter are split or serrated—with size A. If the ferrule and guide windings are to have borders of another color, leave these until the last thing. Take a spool of A and cut off a piece a foot long and rub this carefully with wax, which must be colorless and free from foreign matter that will darken the silk. Twist this piece of silk in the opposite direction to that followed in its manu-

facture, so that the strands will separate, and hold them apart until each one of the three can be removed and laid aside. Now take up one of the strands and wax it thoroughly. It will remain a trifle kinky, but that will not matter. After it is waxed, it will cease trying to snarl up, as at first, and you will have a really strong thread of silk floss much softer than the three-ply strand from which it was taken. Try it on the thin tip of a fly-rod, and you will notice that in winding it will lie flat and spread out a trifle, like a ribbon, while it will not look so lumpy, even, as a thread of OO silk, and after the rod has been varnished the windings will be very neat and workmanlike.

It is obvious that this thread is not so strong as three-ply, and it should be tested to determine how much strain it will bear without breaking. It is stronger, however, than would be supposed, and I have wound a fly-rod tip with separated strands of O without breaking more than three all told; so that the A strands will give little trouble on this score if properly waxed.

Of course, in employing this method, you

cannot work from the spool, but must cut off suitable lengths and wax and separate the strands before beginning to wind. This is more tedious than employing silk direct from the spool, but you have the advantage of preparing the material for several windings at one time, and a little experimenting will determine how much to cut for certain work. A strand fifteen inches in length will make four or five narrow windings for a fly-rod tip, but for the joint and butt much longer strands will be necessary.

Because of the flat, ribbon-like form of the separated strands, fewer turns to each winding will be the rule than if OO were used; but the silk is so thin when tightly wound that no objections can be raised to its bulk. Given a coat of shellac on the silk only, and the entire rod then coated with the best light coach varnish, put on while warm, the rod will be a work of art, and a finger rubbed over its length will barely feel the windings.

Finally, the thinner the silk employed in windings, the less will they be cut and frayed by the fly line. A great many of the enameled fly

lines break, or, rather, the enamel breaks in places if much used, so that the line is not smooth and wiry as when new, and such lines wear the windings rapidly, particularly those in which large sizes of silk are used. I have seen new tournament fly-rods with every winding on the tips cut entirely through after a few days' use, necessitating considerable expense in renewing windings and varnish; but this is often due to insufficient varnish in the first place, or to coating the rod with shellac instead of good varnish. It is much less trouble and cheaper to shellac windings, rod and all at one time than to shellac the windings, then varnish over all, two coats; but it is not so satisfactory to the owner of the rod.

CHAPTER XV

Varnishing Rods

When your rod has been wound, it is well to take up each joint, and while turning it rapidly, pass it over an alcohol or gas flame to remove all fuzzy ends of silk. Be careful that the flame is not close enough to scorch the windings, however. If any ends of silk protrude, cut them off short with a sharp knife.

Now warm your grain alcohol shellac slightly, so that it will flow well, and with the thin, round artist's brush previously referred to, coat each silk winding evenly, being careful to keep the shellac off the wood. As a rule one coat on the windings will be sufficient, but if the silk seems to be dry and dull after the first coat has dried, go over it lightly a second time, and let the rod dry for several hours. Because the shellac

seems to be dry and hard on the surface of the windings after an hour, do not take it for granted and go ahead with varnishing. Shellac dries on the surface first, and if two coats of shellac are put on windings, it is well to let them dry for a couple of days before attempting to varnish.

When you take it up again, go over the wood with a piece of flannel or linen, rubbing lightly but thoroughly to remove any wax, grease or oil that may have accumulated there during the winding. This is absolutely necessary to the attainment of a nice finish, and after the shellac on the windings is hard no harm can be done by polishing the wood with a strip of soft cotton or silk, boot-black fashion. To do this hold one end of the joint against your chest and rest the other end against something firm, to prevent turning. While it is not necessary, the shellac can be warmed slightly over a flame at this stage and the joint turned while a finger is passed around each winding to smooth down any uneven surfaces. After this do not touch the wood or windings with your hands; pick it up by the ferrules instead.

When you are ready to varnish, select a warm day if possible, or at any rate one when the air is not humid or moist. The rod should be warmed in a room where the temperature is 75 degrees, and your can of extra light coach varnish should be left for ten minutes in a pot of steaming hot water, to be sure that it will be thin and all particles of gum contained in it will be melted so that it will flow nicely and dry rapidly. A warm rod and hot varnish will insure a nice finish.

For your work it is assumed that you have procured a flat brush of good quality, and that you are ready to begin by holding one end of a joint on a table and the other in your left hand. With a modest quantity of varnish, pass the brush from the top down for four inches, turning the joint slowly while the brush is held at an angle of about 20 degrees to the rod. Work very slowly, and in going over each winding see that a bare spot is not left there, caused by the brush skipping over the silk and missing the wood just beyond. To prevent this it is sometimes advisable to pass the brush around the rod at each winding first, then, when the varnish in

BAIT-CASTING PRACTICE.

it is nearly exhausted, go over that part lengthwise, to insure an even coating. At any rate, great care must be exercised to prevent daubing the varnish on in places and skipping others.

The first coat should be worked in, with no attempt to flow the varnish on, and be careful lest varnish accumulates around the guides, and leaves them gummed up and unsightly. The same care is necessary with reference to the ferrules. To avoid marring them, pass the brush around the contiguous winding very slowly, coating the silk but not encroaching on the metal.

When all the parts of the rod are varnished, if they can be assembled and the rod suspended in a fairly warm, dry room, free from dust, for two or three days, all should be well. A brad driven in a picture moulding is ideal, provided the rod does not hang close to the wall, but the center of a room is a better place, as some walls are cold, even damp, and on the side of a rod hanging close to such a wall the varnish may crawl and spoil your work.

In spring or summer it is usually safe to varnish a rod in the morning and suspend it in a window. The morning sun is not too warm, but

it is often too warm after 10 o'clock for the best results. Plenty of fresh air is best, but a windy place should be avoided, as dust is likely to be flying there. Do not leave separate joints, while they are drying, where careless persons may accidentally knock them over or break them, and see that they are kept indoors at night. Do not touch the varnish with the hands.

Perhaps you will be satisfied with one coat of varnish. If it is evenly applied it will be sufficient for split bamboo rods; but coach varnish applied while warm is not very thick, and a light second coat will keep out moisture. The first coat should set in four hours and be hard enough for a second coat in less than a week. The second coat, however, should be given as much time as possible to dry and harden before the rod is used, depending on the temperature. This coat can be deferred with safety until the middle of the season or even until the following winter if the rod is not subjected to hard usage; and if it is still in good condition, the new varnish will make it like a new rod. For hard use, however, two coats of varnish will not be wasted, but three will not be needed.

If spar varnish is to be used—and many salt water anglers employ it—three coats, with several days between, will be necessary.

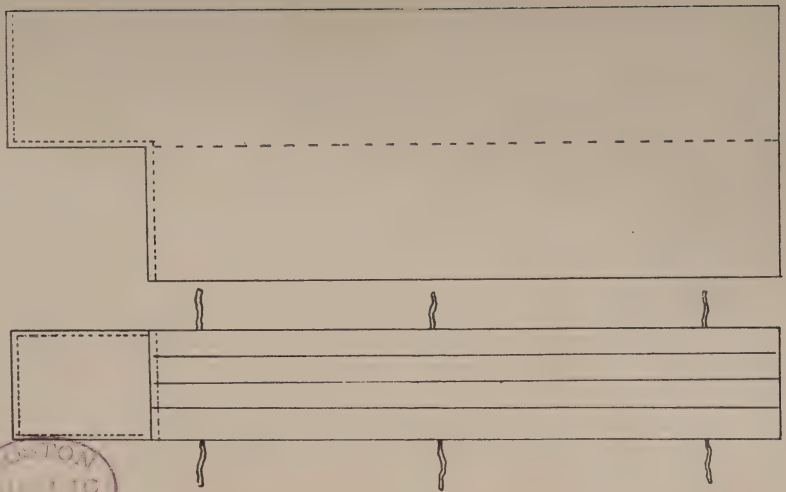
Cord-wound hand-grasps should be given two coats of shellac and one of coach varnish. More will be likely to render the cord slippery. If the grasp is sumac, omit the shellac and put on two coats of coach, giving it ample time to dry.

CHAPTER XVI

Rod Cases and Forms

On the use to which you will put your rod depends the kind of protective covering you will need. There are anglers who will have nothing but a thin muslin cover, but something better is needed for rods that are to be carried far.

The makers of the best fly-rods supply bamboo tubes with screw caps for the tips, this tube and the middle and butt joint going into a canvas case, so that the stiff tube protects the two other parts when all are bound with the tie-tapes of the cover. The wood form is the most common type, and these are cheap. Aluminum tubes with screw caps are obtainable in the trade, costing $2 or $3, and suitable for either fly or bait rods. Aluminum tubing of almost any desired size is obtainable from the supply companies, at



FIGS. 56 AND 57.

20 to 50 cents per foot, and fibre tubing of similar sizes can be had from some hardwaremen at about the same prices. Both fibre and aluminum tubes are made in sizes up to about two inches. For long rods a tube of some sort is very handy. It can be fitted with corks, or with a screw cap on one end, and in such a case a rod is safe.

Tip cases are sometimes made to order by houses that supply mailing tubes. The method of winding the strips of strawboard spirally makes these tubes tough and strong, and if the walls are thick, the ends corked and the tube supplied with a canvas case, the rod will be well protected. I have seen these tubes as small as one inch in diameter, for long tips. Sometimes they are covered with leather. They are frequently made thus for bait-casting rods which have separate handgrasps, the grasps to be carried in a pocket or tackle case.

A very good plan is to groove a piece of white pine so that the tips of the rod will lie below the surface, the grooves being enlarged to let the guides go underneath, then inclose this form in a canvas case with the butt and joint, the whole rod being fairly well protected.

Still another way is to employ a canvas case of the form illustrated in Figs. 56 and 57. The upper end is bound with braid or is hemmed, the lower edge turned over and sewed to the upper one, then three seams sewed lengthwise and three tapes attached to the back. This leaves pockets for the butt, the joint and the two tips. One of the tip pockets is made large enough to admit a piece of wood a half-inch square and of the same length as the tips. Round off its corners and it will not injure the tip. When the rod is taken out of the case this piece of wood will remain to protect the extra tip, which might otherwise be broken.

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